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ANNALS of the
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"EXCEPTIONALISM IN GEOGRAPHY" RE-EXAMINED*

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PREFACE TO TWO PAPERS

In a letter published in the *Annals* in March 1954, I asserted that the article referred to in the above title consisted in large part of false statements concerning the work of other students. The letter also recognized that colleagues of standing in substantive work had been impressed by the challenge which the article directed against concepts concerning the nature of geography which had hitherto been widely accepted. Such questions, it appeared, had been troubling many of our colleagues for some time and they therefore welcomed the bold challenge, much as they regretted to hear of its scholarly deficiencies. On their urging, I agreed to prepare a paper that would offer answers to the methodological questions involved and at the same time would demonstrate the specific distortions and mis-statements of fact concerning the writings of other scholars of which I had accused the article. Such demonstration was needed not merely to justify that criticism but still more to correct the record so that future students would not be misled.

The attempt to combine in one paper positive answers to fundamental methodological questions with correction of errors in the article that raised the questions proved to be both difficult and confusing. The constructive answers should not depend solely or primarily on my own thinking. Experience demonstrates that methodological studies that depend on a single scholar are not apt to prove of great value; we can hope for continued progress only if we can stand on the shoulders of our predecessors. The writings of past geographers that are of greatest value in attempting to answer the questions and doubts in the minds of present geographers include the works used in the article under challenge. This would present no difficulty in a more nearly normal case of dispute over the conclusions of another writer, in which one can accept the greater part of the source material as sound, only occasionally needing to correct mis-statements of fact. But since the article in question contains far more errors than correct statements, a paper attempting to combine logical discussion and correction of false statements would be greatly overweighed by the latter, to the confusion of the readers.

It therefore seemed necessary first to cleanse the muddied sources; to find and correct the mis-statements of historical fact in the original article. From this it was revealed that almost literally nothing remained of the article that was valid for further use, other than the particular questions on which it had pronounced dogmatic answers. These questions themselves, however, are not new. They have been raised in innumerable seminars and "bull sessions," with rather

* "Exceptionalism in Geography: A Methodological Examination," by Fred K. Schaefer, *Annals*, Association of American Geographers, XLIII (September 1953), pp. 226–249. References in the present paper to this critique are given by page numbers in parentheses. References in brackets are to the numbered entries of the references listed at the end of this paper, e.g., [*2:* 221–225] means reference #2, Hettner's *Die Geographie . . .*, pp. 221–225.

more than less reliable quotations from our literature, and views similar to those in the article in question have been presented by scholarly writers in studies that merit serious consideration.

Consequently it was concluded that the two assignments I had accepted, and which had been worked upon separately, should remain separate in publication. The paper which follows has the negative purpose of demonstrating and correcting the falsifications of the article named; this in effect returns us to the status quo preceding the publication of that article. With the slate thus cleaned, the questions which colleagues have raised concerning the character of geography in comparison with other fields of knowledge will be treated constructively in a paper to be published in a forthcoming issue; it will include no discussion of the original article or of this re-examination.

INTRODUCTION

THE primary purpose of this paper is to provide correction to false representations and accusations in an article published in the *Annals* of 1953. The false statements are examined and corrected in the main body of the paper.[1] Those who did not read the original article or recognized its unreliability may well save time by ignoring both this re-examination and the original article. Readers who found themselves to any extent in agreement with the conclusions of the original article and accepted any of its statements on face value will be interested to read the discussion of the questions at issue in a later constructive paper. They will, however, avoid confusion if they first read far enough in this demonstration of falsity to disabuse their minds of the mis-statements by means of which the original article arrived at its conclusions.

It would be regrettable if the amount of work spent in this re-examination should serve only its negative purpose of cleaning the slate. The writer himself has learned much from the experience and should make that learning available to others. While most geographers, quite properly, do not wish to expend their energies on methodological studies, all of us have our own ideas on such questions and many, on occasion, express such views in print; most of us read at least some of what others write in this field, and some of us may be called upon to aid in determining whether any such study is worthy of publication. Clearly we need a set of standards for evaluating such studies, and a means of applying such standards.

Methodological study differs notably in two respects from the type of work for which geographers are trained. First, as Schaefer notes in a statement I find very apt, "methodological discussion is essentially dialectical in that much clarification is derived from the mutual criticism of contending viewpoints." Clarification, however, can result only if the statements of the viewpoint a writer is criticizing correctly represent the view the previous writer actually expressed in his original statements, correctly interpreted in terms of their context. In methodological discussion

[1] The use of such terms as "false" and "deceptive" throughout this article is to be understood solely in the sense of consideration of the writing in the critique as it exists as a fact in itself, and without reference to its responsible author. Our concern in methodological discussion, as I suggested some years ago [*15:* 122–125], is with the writing, not the writer whose name we use as a convenient label. It is appropriate to note that this principle is followed in the critique itself, so that I have found no difficulty in examining it without personal feeling toward its writer. It is all the more imperative to follow this principle in this examination because the author of the paper under consideration is no longer able to reply.

and in any examination of the history of methodology, the facts on which the student must base his work are the verbal facts of the printed record. Subjective reactions or personal impressions of the critic are facts about the critic, not about the writing or writer. This is the second respect in which methodological study differs from the usual work of the geographer, in which he customarily regards as "facts" only tangible objects or statistical data.

There is, however, no mystery about the principles of historical and literary scholarship. Some years ago I suggested, on the basis of such general principles, a number of rules for methodological writing [*15*]. As a result of the present study these have been amplified and are presented below. How these standards may be applied in a concrete case can be judged by the reader from the re-examination of the article under scrutiny in the main body of this paper. The running text considers only the material offered in the article itself, as that could be examined by a geographer but little versed in the methodological literature; the footnotes present the evidence secured from examination of the sources of statements in the article.[2]

Rules for Methodological Writing

1. Progress toward common understanding of sound methodology in geography calls for the application of responsible scholarship.

2. Methodological studies require standards of scholarship no less exacting than those expected in substantive work.

3. While no study, by however eminent an authority, is immune from criticism, respect for the profession as a whole requires that the work of scholars who have earned the respect of the profession be treated with respect.

4. It is both appropriate and desirable that a published paper in methodology be subjected to critical evaluation in terms of its basic assumptions, the reliability of its evidence, the soundness of its logical reasoning, and the extent to which it gives due consideration to the findings of other students on the same problem or problems.

5. Critical studies of the writings of others should be no less meticulous in scholarship than the works criticized. Since "facts," in critical studies, consist of the words written by previous writers, the criticism should present the words adequately and fairly—preferably in quotations or, if paraphrasing is unavoidable, in reliable paraphrases guaranteed by precise citations.

6. Criticism of the views of any writer on a particular topic should include consideration of all the relevant facts. Readers may expect the critic to demonstrate familiarity with the work under criticism and fairness in utilizing all the relevant statements in that work.

[2] For a large number of these, the source was found to be *The Nature of Geography* [*1*]. In addition, I have also referred the reader to numerous references in that volume, rather than duplicate the references readily available there. Furthermore, many of these sources can be found in only a few libraries in this country. Since, however, that reference work is meticulously documented—and not more than a minute number of errors have been reported to me—any reader who cares to may use it to find the full statements of the original author.

7. Ideas which a student has acquired from the writings of previous scholars and made a part of his own thinking do not require references or citations of source, though inclusion of such reference is not only an act of courtesy but of value to the reader. But in a methodological study criticizing or attacking the position of another student in terms of statements labelled as those of that student, other statements of the same student which the critic uses to support his side of the argument must be identified by source.

8. Attack on another's work or views should be by direct criticism rather than by statements, or omissions, from which the reader is led to infer criticism.

9. Similarly, the purpose of a line of argument intended to demonstrate error in the views of another student should be clearly indicated from the start, so that the reader will not be misled, by failing to check on points of apparently minor importance, into accepting premises which later in the discussion are used to make the conclusion appear fully substantiated.

10. Scholarly biographical explanation presumes the search for available facts about the life and work of the writer discussed, prior to interpretation, and clear distinction between facts and conjectures.

The Need for the Re-Examination

Many readers will no doubt question the necessity for a re-examination, particularly such a complete one as this, of an article which, in their view, has no great importance. We are not considering a student's "bluebook" in which examination questions have been answered from memory, nor a manuscript for which no one but the author is responsible, but a published article which has been acclaimed by not a few geographers, and which remains in the *Annals* available to students of geography in the universities of the world for the indefinite future. The article deals with some of the most fundamental questions concerning the nature of our field and presents views purporting to have been expressed by students of greatest importance in the field. These statements and interpretations of their views differ radically from those which have hitherto been accepted.

The article appears to have demonstrated that methodological studies that have perhaps been most influential in recent geographic thought in Germany and in this country promote viewpoints in opposition to those of the early masters of geography on whom the writers of these studies believed they had based their thinking. The most eminent methodologist of our time, Hettner, appears not only to have failed to understand what his predecessors had "clearly" expressed, but to have vacillated between two opposing philosophies of science, and thereby "laid geography open to a host of non-scientific, romantic ideas." A volume which many students in this country and abroad have found valuable, *The Nature of Geography*, which the Association continues to publish, is apparently shown to be unreliable in numerous respects as a guide to the literature of the field—a function that has been its greatest value.

Other than these two writings, the article lists but two others as of major im-

portance in the field—the methodological writings of Humboldt and an essay by Kraft. But the only writing of Humboldt that is named is dismissed as not dealing with the methodology of geography. The essay of the philosopher Kraft is highly praised but little considered. Of other writings in the field, one or two are summarily condemned, and only a few brief statements are derived from others. Of the methodological writings of such scholars as Richthofen, Mackinder, Vallaux, or Sauer—not to mention scores of others—the student will find not a word.

No doubt few students will recognize consciously the almost completely devastating result to which these conclusions lead. The effect on young students may nonetheless be serious. Even if they shrug off the ultimate conclusion as obviously excessive, the apparent demonstration of the inability of supposedly eminent scholars to interpret correctly the writings of their predecessors tends to destroy the confidence of students in scholarship itself.

In major degree, the conclusions that have been extracted from the article are justified if one accepts what are presented as facts—the statements purporting to represent what the individual scholars originally wrote. If, then, these statements are correct representation of those facts, this is the most important article in geographic methodology published in any country in the past hundred years. If, however, the statements are false, the article represents, at the least, defamation of the work of established scholars past and present. If some of the statements are true, others false, it is not clear which of its conclusions, if any, are sound. It is easy, but tender-minded, simply to dismiss the article as unimportant either way. Scholars, as William James insisted, have the obligation to be tough-minded. The representations and accusations of this article require thorough and objective evaluation.

Much labor, and paper, could have been saved if the purpose could be accomplished by a few examples, but readers will hardly be convinced that demonstration of falsity of sample statements chosen by one critic, especially by an injured party, proves that other statements, for which no such demonstration is provided, are equally false. It is necessary to check each statement concerning every writer named in the article to determine whether it is true or false. It was also discovered necessary to check each statement not ascribed in the article to any writer but presented as sound doctrine, to determine whether that was not in fact taken from a writer alleged elsewhere in the article to have held an opposite view.

The length of the re-examination is due not only to the great number of falsifications in the original article but also to the fact that many of them are asserted without evidence. To deny them with no evidence would be legitimate but hardly effective.[3]

[3] Because the views of other writers are presented in the critique commonly without page citations, rephrased in a different style, and paraphrased with the greatest laxity, it is often difficult to be certain that one has traced the paraphrase to the particular passage from which it was derived. One is forced to employ methods of literary detection not normally appropriate in scholarly criticism. Thus, the determination may depend on the carry-over of unusual words or the obvious transformation of specific words and phrases; this method is illustrated in many

RE-EXAMINATION IN DETAIL

Introduction of the Critique (226f.)

If the purposes of the article may be assumed to be indicated by the introductory paragraphs, the general purpose is to belittle the methodological literature of geography in general, while the specific purpose is to disparage the work of Hettner and myself. "The methodology of geography is too complacent."[4] Further, it "is small,"[5] containing major contributions from only four writers, one of them not a geographer.[6] No reason for the selection of these four is given and there is no reference to any standard source on the history of geographic methodology, either here or in later sections in which the article is concerned primarily with historical account.[7] On the basis of the treatment given these four contributions subsequently, the reader may well wonder why any of them were listed as of major value.

The reader is introduced to Hettner's work with Spethmann's complaint that his volume of 1927 reflected little change in ideas he had published in separate articles twenty or more years earlier, though without mention of the specific changes Spethmann advocated.[8] *The Nature of Geography* was evidently still more out of

of these footnotes, such as 27, 29, 49, 64, 87, and 90. In each of these cases, the correspondence was found to be as close as or even closer than those in which the source is cited in the critique.

[4] Methodological discussion among German geographers was vigorous and at times heated [*1*: 136–140]. Hettner's views were repeatedly challenged by various of his colleagues [*1*: 128, 142, 190ff., 310].

[5] The statement would be acceptable if it read, "the methodological literature considered in this critique is small," as the reader may readily determine by comparing the handful of sources used in it with the bibliography entries, running into the hundreds, in *The Nature of Geography*. The sources on methodology of geography used in the critique had all been used in *The Nature of Geography;* the only new ones listed are mentioned only to be condemned.

[6] In terms of methodological contributions of essentially original thought that have proved of major influence in geography, Hettner's work is the only one of those named that could properly be included in such a short list. For nearly a century geographers were hardly aware of Humboldt's methodological statements, since he published no articles or books in that field [*2*: 85]. Kraft's one essay is primarily a summary of views of German geographers in the first quarter of this century and is seldom mentioned in later German writings. *The Nature of Geography* is of importance primarily not in terms of contributions within it by its author, but rather, like Kraft's essay but on a broader and more thorough scale, as a critical presentation of the views of many scores of students.

It would of course be silly to attempt to determine which contributions to methodology should be named as the only major ones, but German geographers would no doubt agree well-nigh unanimously that any such list must include the names of Ritter and Richthofen. The text of the critique appears to consider Ritter's writings as of major importance although his name is not listed originally; there is no mention of Richthofen in the critique.

[7] References in the critique include Hettner's volume, which contains a section of over a hundred pages on "The History of Geography" [*2*: 1–109], and *The Nature of Geography*, which has an equally long section on the "Historical Background" of geographic thought [*1*: 22–129]. Use of either of these sources, of which the latter is meticulously documented, could have prevented a large number of errors, but evidently both were ignored.

[8] The changes Spethmann advocated were undoubtedly not acceptable to the writer of the critique [*1*: 138, 176f.].

date in 1939 since "it restated many of Hettner's views with little change or criticism."[9] "Worse than that," this latter work, though a "milestone," had gone unchallenged through the thirteen years since its publication, a statement which readers of the *Annals* during that period know to be in error.[10]

The other two major contributions offered the reader are the methodological writings of Alexander von Humboldt, which are not named but which, of course, are more than a century old, and one essay by the Austrian philosopher of science Viktor Kraft, which was published a decade before *The Nature of Geography.* In contrast to the latter work, which followed Hettner,[11] Kraft is said "to continue more nearly the tradition of Humboldt." There is no evidence, either here or in the entire article, to justify either this generalization or the listing of Kraft's essay as a major contribution; it is barely mentioned three times—once as agreeing with Humboldt, once as agreeing with Hettner, and once as not following Immanuel Kant.[12] The manner in which the essay is presented in the introduction and subsequently referred to in the body of the essay, encourages the reader to infer that *The Nature of Geography* had not presented this "unexcelled" study to American geographers.[13]

Section I of the Critique

The first section of the critique likewise opens with disparaging, not to say scornful, comments on certain views of geography said to be held by contemporary students who are not identified. The views of geography which are presented as sound are not based, as one would expect from the introduction, on recent developments of scientific thought; rather they are views purportedly expressed over a century ago by Humboldt and Ritter. This comparison leads next, though the connection is not clear, to a long discussion of the difference and relations between regional and systematic geography in which views identified as those of Hettner and Hartshorne are presented as in opposition to views purportedly expressed by Hum-

[9] That Hettner's views were not accepted in my volume without critical consideration is indicated by the several instances in which his views are opposed [*1:* 309f., 388, 418].

[10] The presidential addresses of Sauer and Whittlesey and an article by Ackerman, all published in these *Annals,* contain major challenges to views in *The Nature of Geography* [*1:* xxxiv, xxxviii, xlv, xlix].

[11] The relation of Hettner's viewpoint to that of Humboldt is discussed in numerous places in *The Nature of Geography* [notably, *1:* 93–98]. In his dissertation on *"Wesen und Aufgaben der Geographie bei Alexander von Humboldt,"* Döring found fundamental agreement between Hettner's views and those of Humboldt [*18:* 166–168]. While this publication of 1930 is neither widely known nor everywhere available, it is very frequently mentioned in *The Nature of Geography* and is available in this country through interlibrary loan. Any writer who has not studied it should be considered incompetent to pronounce on Humboldt's methodological views.

[12] As later footnotes (16 and 31) will show, Kraft was in all these cases following Hettner and said nothing whatever concerning Humboldt's views.

[13] The implication is false, as anyone may note by looking up "Kraft" in the Author Index of *The Nature of Geography.* His essay is described therein as "a brief but very instructive examination of the unity of geography as a science" [*1:* 143], and much more use of it is made in that volume than in the critique under study.

boldt and Ritter. Thirdly, the fact that geography includes both the systematic and regional approach is said to be one of several aspects of the field which have led some students—again these are not clearly identified but it later becomes evident that Hettner and Hartshorne are meant—to claim that "geography is quite different from all the other sciences, methodologically unique, as it were." These several aspects, of which but two or three are specified, are said to form "a whole host of ideas," for which the critique coins the term "exceptionalism." (231). Since this corresponds with the title of the paper, the reader may well suppose that at last, on the fifth page of the critique, he has been told the subject of discussion.

Geography according to Humboldt and Ritter (227–228). Humboldt and Ritter appear as twins, or as though they had written in partnership. There is no reference in this section to any of Humboldt's voluminous writings and the one work mentioned elsewhere in the paper, the *Kosmos,* is considered there only to be dismissed as a discussion of something neither geography nor science (234). Of Ritter's many methodological essays, one is correctly named as citation for a single phrase—the sole quotation in this section—but other parts of the same sentence cannot be assumed to be derived from that source, or from any other writing of Ritter, since the sentence places him in the anachronistic position of observing "the successful rise of geophysics."

From sources not clearly specified, the reader is presented, as coming from these two masters,[14] certain definitive statements the importance of which will be apparent only later in the essay. For science in general, "all natural relations are governed by laws." Since the word "natural" is used in a preceding phrase in the same sentence in the sense of "natural sciences," the reader will no doubt accept the statement without question and may or may not observe that in the next para-

[14] The two long paragraphs purporting to present the views of Humboldt and Ritter (227–228) include: (a) statements derived from one or two pages in the one essay of Ritter's that is cited [*7:* 45f.]; (b) ideas derived apparently from one or two incidental sentences in the introduction to Humboldt's *Kosmos* [*4:* 55f.]—a source which in the next section is ruled out as not representing a discussion of geography but of cosmology; (c) a statement—concerning "earth surface"—from Kraft's discussion of geography in the present century [*6:* 4]; (d) a statement—concerning the terms "chorographic" or "chorological," which neither Humboldt nor Ritter used, but which were reintroduced from the Greek geographers later in the century—taken apparently from *The Nature of Geography* [*1:* 91–93]; and (e) various views of the writer of the critique (including the greater part of the second paragraph).

Insofar as the statements are derived from Humboldt and Ritter, the original meaning is notably altered or restricted by the inadequacy of the paraphrasing. Even the phrase in quotations, a translation of Ritter's most famous description of the object of study in geography, is a misconstruction that destroys the meaning emphasized in Ritter's discussion. This error has been made before and had been corrected in *The Nature of Geography* [*1:* 57]. Reliable presentation of the views of Humboldt or Ritter, based on many specific quotations and supported by numerous critical studies by German students of established competence, is readily available to the interested reader [*1:* 53–84]; additional and corroborative material will be found in Tatham's excellent discussion of the work of German geography in the nineteenth century, in Griffith Taylor (ed.): *Geography in the Twentieth Century* (New York, 1951), pp. 42–59.

graph the meaning has changed under his eye—"natural phenomena, including man."[15] Geography in particular is (1) primarily concerned with the formulation of laws; (2) limited to the earth surface; and (3) concerned with "the laws governing spatial distribution"—i.e., it is "essentially chorological." This interpretation of the views of Humboldt and Ritter is confirmed, the reader is told, by a summary statement by Kraft.[16]

If these statements could be considered as valid, in spite of certain sentences and the confusing intermixture of paraphrase and comment, what is their relevance?

With respect to the first, that geography, like all other sciences, is primarily concerned with the formulations of laws,[17] the reader will learn later that various geographers at first unnamed have apparently held an opposing viewpoint. Thus, after discussion of a different topic, he is told that at the present time one "finds most geographers still busy with classifications rather than looking for laws." A little farther on the reader is taken back to "the beginning of the century," when "the social geographer scorned the fumbling systematic efforts which . . . attempted to find the laws. . . . Any generalization . . . was considered empty and unpractical by these writers; regional descriptive geography appeared to them the only honorable occupation. . . . In whatever methodological writing they did, they aligned themselves with the opponents of scientific method" (229f.).[18] These "opponents

[15] In this sense the statement becomes a strong assertion of scientific determinism. I find no such statement in Humboldt's writings and a direct denial of it in the essay of Ritter's named in the critique: *"Das Erdsystem . . . gesetzt . . . nicht in seinem historischen Leben"* [*7:* 51]. Humboldt appears to express much the same view in the final paragraph of the first volume of *Kosmos.*

[16] The statement that "Kraft, in discussing Humboldt and Ritter, agrees with them that . . .," represents extraordinary carelessness which has great consequence. Kraft's essay barely mentions Humboldt and contains not a word of discussion of his views, and the few brief references to Ritter have little or no relation to what is said in this paragraph [*6:* 3, 5, 7]. It is correct that methodological statements in the paragraph are found in Kraft's essay and that, on the whole, he agrees with them, but Kraft presents them as a summary of *contemporary* views of geographers, based primarily on the writings of Hettner!

If the writer of the critique had not made this careless error, his paragraph, further corrected for certain lesser errors, should read: "Kraft, in discussing Hettner, agreed with him that geography is, at least in its systematic side, a science trying to discover laws; that it is limited to the earth's surface; and that it is chorological; and that this suffices to set geography logically apart as a discipline of its own" [*6:* 8–11]. But if such a statement about Hettner had been included in the critique, it would be obvious that the greater part of the remainder of the paper is fallacious.

[17] No such statement, or implication, is found in the writings of either of these students. Each was concerned, from a somewhat different viewpoint, to attain the maximum interpretation and understanding of the interrelated unity of earth phenomena in areas; for this purpose the establishment of laws was a necessary means to an end [*1:* 53–67, with specific citations].

[18] These geographers are not named and no references are suggested, but comparison of texts demonstrates that the critic is here reacting to a discussion, in *The Nature of Geography,* concerning various geographers in Germany and America who urged (in the 1920's, rather than at the beginning of the century) that geography was the study of regions, that systematic geography was merely propaedeutic [*1:* 456f.]. The insertion of the word "descriptive" within the phrase "regional geography" directly falsifies the view of those students, but this word

of scientific method," however, are evidently still with us, for the next sentence, introducing the paragraph in which Hettner and Hartshorne are named, reads: "All these controversies are still lingering on, so that today hardly an article or book is free from them." Then the discussion shifts to another topic and the attack on the issue of laws in geography is not mentioned again in this section; in later sections, however, it returns.

On the second statement, the limitation of geography to the earth surface, nothing further is said in the entire article. It is evidently irrelevant.[19]

The third statement also seems to drop out of sight, but we will find it emerging in the final section of the paper as one of its major considerations. Further, it appears to offer something of positive value to geographers concerned to find some way of limiting the apparently unlimited scope of their field. "Geography," we are told, apparently in the words of both Humboldt and Ritter, "must pay attention to the spatial arrangement of the phenomena in an area, and not so much to the phenomena themselves" (228). Going further, apparently still paraphrasing Humboldt and Ritter: "Spatial relations are the ones that matter in geography, and no others. Nonspatial relations found among the phenomena in an area are the subject matter of other specialists such as the geologist, anthropologist, or economist."[20] The writer of the critique, evidently without realizing it, has in his own terms established a unique, or exceptional, view of the position of geography among the sciences. Whereas each of the other sciences he names—as the names indicate—studies a particular category of phenomena in their nonspatial relations, geography studies the spatial relations of whatever kinds of phenomena.

The relations of regional and systematic geography (228–231). As a basis for discussion, the critic presents first, apparently as his own, the correct view of the two approaches and their interrelations: (1) regional geography does not involve the search for or formulation of laws, but rather the application of laws developed in systematic geography to the area in question; (2) the procedure in systematic geography "is in principle not different from that of any other social or natural

is needed to justify condemning them as "opponents of scientific method." Immediately following this discussion of the view of geography as concentrated on regional geography, in *The Nature of Geography* [*1:* 457], are statements that demonstrate beyond possibility of misunderstanding that both Hettner and Hartshorne opposed that view; these statements are ignored in the critique.

[19] And also incorrect. This limitation was not established in geography until a generation or more later [*1:* 112, 115f.], and on the other hand had been expressed much earlier by Kant [*1:* 40]. Ritter, following Kant, evidently considered geography as concerned primarily with the earth surface, not for the reasons given in the critique, but rather because of his view of geography as the study of the earth as the home of man [*1:* 60f.]. Humboldt neither asserted nor followed the limitation [*1:* 83]. The statement in the critique is evidently taken from Kraft's discussion, which is based not on Humboldt or Ritter but on Hettner and his contemtemporaries [*6:* 4].

[20] The first sentence is a fairly reliable interpretation of statements of Ritter [*7:* 45f.], echoing somewhat similar statements of Humboldt [*17; 4:* 55]. In going beyond this statement in the succeeding sentences, however, the critic ignores essential parts of Ritter's explanation of what was included in the study of spatial relations.

science which searches for laws," but no parallel is suggested for regional geography.[21]

Then follows a brief historical resumé of the shifting emphasis placed on one or the other approach in geography during the past century,[22] which slips easily into the next paragraph to indicate that, in a debate still continuing, Hettner and Hartshorne weigh the scale down heavily in favor of regional geography. In contrast, the next paragraph claims: "Neither Humboldt nor Ritter were plagued by these pseudo-issues.[23] As they clearly saw, systematic geography attempts to formulate the rules and laws which are applied in regional geography."[24] Distinguishing, for once, between the two writers, the critique presents statements supposedly from Humboldt describing the relation between the two aspects[25] and then offers an ex-

[21] These statements are not new, but rather are derived from Kraft's presentation of the views of contemporary German geographers, primarily Hettner [*6:* 8f., 11]. Though changed in language through double paraphrasing, the meaning is not notably changed from Hettner's and consequently is very similar to that of the views presented in *The Nature of Geography.* Hence, from the start, there is essential agreement on this topic among Hettner, Kraft, Hartshorne, and the writer of the critique; the picture subsequently constructed of major disagreement is therefore false.

[22] This is evidently based on a passage in *The Nature of Geography* [*1:* 456f.], though that fact is not indicated. The first part is almost straight paraphrase, but the latter part goes far beyond the statements in that volume—and far beyond truth—in condemning alleged views of those geographers who argued that systematic geography was a necessary propaedeutic, but subordinated to regional geography, which alone should be recognized as geography (229). The original discussion of this phase in the history of geographic thought included a list of geographers in Germany and this country who had supported that view in methodological writings; this apparently is the basis for the sweeping assertion in the critique: "In whatever methodological writing they did they aligned themselves with the opponents of scientific method." (See also fn. 18.)

[23] This overlooks the celebrated attack that Fröbel directed against Ritter and Ritter's full-length reply on this very topic [*1:* 72–76].

[24] This statement is correctly extracted from the previous description of the character of the two approaches, which the critique derived through Kraft from Hettner, as noted earlier, or it may have been taken from *The Nature of Geography* [*1:* 458, 467]; all these go back to Richthofen [*1:* 92], but not to Humboldt or Ritter. There is no evidence that either Humboldt or Ritter viewed the relation between the two approaches in these terms [*1:* 71–82]. The topic is not discussed in the one essay of Ritter's mentioned in the critique, and the incidental statements on it in the one writing of Humboldt's that is named speak only of the reverse relationship [*4:* 54, 60]. The word "clearly" is evidently used here, as in numerous other places in the critique, in the sense of "no doubt," meaning there is no evidence but the writer feels sure it must be so.

[25] Some of the sentences are evidently derived from passages in Humboldt's *Kosmos,* but these are not discussions of the relation of the two aspects of geography, but rather of the relation of "cosmology" to the systematic sciences [*4:* 32, 65f.]. The terrestrial part of Humboldt's cosmology, to be sure, is identified in *The Nature of Geography* as systematic geography; in these terms, Humboldt's statements consider the relation of systematic geography to the systematic sciences, but not to regional geography. But in the next section of the critique the reader is told that Humboldt's cosmology is not to be confused at all with his concept of the science of geography; on that basis the passages paraphrased from Humboldt have nothing to do with either branch of geography. Further, the writer of the critique has included in his paraphrase three sentences of his own—that the region is unique, that such uniqueness is not

planation of Ritter's work in regional geography, of which the reader may well be skeptical.[26] The last sentences of the paragraph—for which the sources may be Ritter, Humboldt, or the writer of the critique for all the reader can tell—lead to the conclusion that "regional and systematic geography are codign, inseparable, and equally indispensable aspects of the field."[27]

On this issue therefore a marked disagreement between Hettner and Hartshorne on the one hand and Humboldt and Ritter on the other has been definitely stated (though its relevance to the general topic of "exceptionalism" is not clear). This apparent disagreement is constructed without a single quotation from or a single citation to the writings of any of the four students concerned. The sole evidence offered consists of two sentences, both in paraphrase. "Hettner thought that the core of geography was regional."[28] "Hartshorne believes that systematic geography is really indispensable in regional work; whoever likes it, or is by temperament fitted to pursue it, need not desert it; but the heart of geography is nevertheless regional."[29]

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peculiar to geography, that the same method is followed in other fields—which are either irrelevant to, or in direct conflict with Humboldt's discussion. There are also unwarranted additions or omissions in the sentences that are in the main derived from what Humboldt wrote.

[26] The three sentences describing Ritter's position on this topic may be dismissed as pure guesswork. The subject is not discussed in the one essay of Ritter's many methodological essays that is named in the critique. Other essays, in which he did discuss the question and explain his own procedure, demonstrate that the guesses are erroneous [*1:* 71–76].)

[27] These sentences, beginning with the word "conversely," express not the views of Humboldt or Ritter, but of the writer of the critique; these views are apparently continued through the following short paragraph. Both however are reasonably correct paraphrases of passages discussing this topic in *The Nature of Geography* [*1:* the first part is from pages 458 and 468, the latter from 434 and 459, as based on Fenneman and Kroeber]. Specifically the three key terms in the conclusion are derived from statements several times repeated in that text: "codign" [434 and 457], "inseparable" [406 and 468], and "equally indispensable" [434, 458, and 468].

[28] I have found no such expression in Hettner's writings, but I used it in the same passage in which I used the phrase "heart of geography." There need be no uncertainty about Hettner's position; in the section of his volume dealing with the relation of the two approaches, he asserted (as he had in numerous earlier writings): *"In Wahrheit sind beide gleichwertige Teile der Geographie; es besteht keine Rangordnung"* [*2:* 401]. This position of Hettner's is clearly reported in my volume [*1:* 447].

[29] The first two thirds of the sentence is correctly paraphrased from a passage in *The Nature of Geography* which does not contain the last third, but does include the following significant statements which clearly refute the conclusion produced in the critique by the addition of that extraneous clause: "such work [systematic geography] is an integral part of geography. . . . Those who use Fenneman's picture of the field of geography and speak of regional geography as the center, should not overlook his qualification: 'There is no intention of assigning more dignity to one part of the field than to another, nor of asking any man to turn aside from that which interests him to something else. There is no more inherent worth in a center than in a border.'" [*1:* 434.]

Nowhere in the volume is there a definitive statement that "the heart of geography is regional." A figurative phrase has been taken out of context, from a different discussion [*1:* 391], and made into a positive statement, further strengthened by the unwarranted addition of the word "nevertheless."

In each statement the significance depends on a figure of speech; without further clarification of the weight assigned in the original to "core" or "heart," the reader is left guessing. If he wishes to seek clarification, the absence of citation forces him, in each case, to hunt through a large volume for the original passages. In the critique no explanation or clarification is offered, but rather a guess is transformed into a conclusion, which in later sections is treated as though established. On the basis of the single phrase "heart of geography," the evaluation of systematic geography in the original as "really indispensable" is reduced, by distorted argument through analogy, to "merely esoteric byplay."

This piece of palpably false jugglery might well suffice to indicate to the reader that the function of this discussion of the relation of systematic and regional geography is not to inform him of what Hettner and Hartshorne actually say about that relationship but rather to convince him of something that could not be established by candid exposition. The reader might well dismiss the two pages devoted to this topic as in all probability false.[30]

Exceptionalism (231). In the last main paragraph of the section, two ideas about geography are considered that explicitly set it "apart from all other disciplines." Hettner, "and even Kraft," are said to have asserted the first of these, possibly also the second (depending on what interpretation the reader gives to the paragraphing, an uncertain matter in this paper since in numerous instances that appears meaningless). The first refers to regional and systematic geography "as founding a 'dualism' which sets geography apart from all other disciplines . . . a methodologically unique discipline." No source is given.[31]

[30] Far more so than the reader could have suspected. The previous footnotes, when put together, show that the views ascribed to Hettner and Hartshorne on this question are falsely fabricated; the views presented as those of the critic in opposition to theirs are in fact derived from what they actually wrote. On the views of Humboldt and Ritter, no correct statements are presented.

[31] Many German students of geography believed that this form of "dualism" in geography resulted from the marked difference in emphasis in the views of Ritter and Humboldt: Ritter emphasized the necessity of studying regional geography first, whereas Humboldt was primarily interested in systematic geography and treated regional geography almost as a separate field; the first major attempt to reconcile the two viewpoints was that of Richthofen [*1:* 84–93]. Hettner, in contrast to many of his colleagues, did not accept the term "dualism" but held that the two approaches could not be separated in practice and that there were gradations between them [*2:* 399ff.]. He did not, to my knowledge, compare this feature of geography with other fields. Such a comparison is made in *The Nature of Geography*—in which the term "dualism" may also be found—with the conclusion that a similar situation, differing only in degree, is found in such fields as astronomy, historical geology, and history [*1:* 408–413]. This is something less than "methodologically unique."

This is but one of several instances in which the critique confuses material in *The Nature of Geography* with Hettner, either through ordinary or rather extraordinary carelessness, or on the assumption that everything in that volume is taken from Hettner. This myth, which is not uncommon, ignores the precise documentation in that volume which enables the reader to observe the source of nearly every sentence.

The statement in the critique was most likely derived from Kraft, but actually understates the view he expressed. The philosopher found the two approaches so different in purpose as

The second peculiar idea, which was also mentioned disapprovingly in the introductory paragraph of this section, is that "geographers are distinguished among the scientists through the integration of heterogeneous phenomena which they achieve." Whether Humboldt or Ritter thought the same or differently we are not told. Nor is there any reference to the writings of any contemporary student.[32]

Summary. The "whole group of ideas," described in the concluding paragraph under the name "exceptionalism" amounts, so far, to not more than three. On these, no evidence has been brought to show that any geographer asserted any one of them, or, on the other hand, that they have not always been accepted by all geographers.

The unstated theme of this section, the contrast between the views of Hettner and Hartshorne on the one hand and of Humboldt and Ritter, together with the writer of the critique on the other, with Kraft now on one side, now on the other, has not been established. Further, in view of the failure to adhere to minimum standards of scholarship, and the frequent intermixture within apparent paraphrases of comments by the writer, one cannot accept as reliable any of the statements purporting to show what Humboldt and Ritter said concerning the scope and purpose of geography or the importance of scientific laws. For all one knows these may be merely vague impressions made on the mind of the critic in reading unnamed writings by those students. Likewise one can not accept the indirect and vague intimations that Hettner and Hartshorne promoted views opposite to those of Humboldt and Ritter.[33]

Section II of the Critique

Section II of the critique deals with two of the presumed "historical roots of exceptionalism" and falls into two parts, the division occurring in the midst of a paragraph (12th line of page 234).

Kant's lecture in his elementary course (232–234). This portion of the critique is unique in providing a full quotation of a viewpoint that is under criticism. Thereby it offers the reader an opportunity to observe for himself the technique of

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to be logically incompatible in a unified field. Although their inclusion in the same field was justified by its historical development, he suggests that the different branches of systematic geography might well become independent, leaving geography proper limited to regional geography [*6:* 11–13].

[32] Every one of the students listed in this section—Humboldt [*4:* 55], Ritter [*7:* 50], Hettner, Kraft [*6:* 9], and I [*1:* 145]—wrote statements somewhat like that under criticism, but no one of the group claimed that in this respect geography was "unique," or even, in the quaint form of the earlier statement, that "geography, together with history, emerges as 'the integrating science'" (227). From whichever of these writers one chooses to take the statement, it is either explicitly stated, or clear in the context, that the comparison is between geography and the systematic sciences, *not* all other sciences. Indeed, one of the main headings listed in the Contents of my volume carries in its title the phrase "other integrating sciences" [*1:* v. 408]. Likewise none of these statements carries the "presumptuous" implication that integration of diverse factors is absent from work in the systematic sciences.

[33] More positively, in the light of the errors of commission or omission that have been found in every paragraph, the section must be pronounced as well-nigh completely false.

criticism characteristic throughout the critique but more hidden in other sections. Before Kant's statement is presented, its author is belittled—"The great philosopher . . . was a poor geographer"[34]—and the statement itself is distorted by a paraphrase introducing a purpose and concept not found in the original: "Kant made the *exceptionalist claim* . . ."; "history and geography find themselves in an *exceptional* position different from the so-called systematic sciences" (italics added). Hence, "The father of exceptionalism is Immanuel Kant." His statement in an introductory lecture to elementary classes in a popular course on geography "is undoubtedly one of the roots of the historicist variant of the claim to uniqueness" and "has been quoted so reverently again and again by those who make it the cornerstone of geographical method"—including specifically Ritter, Hettner, and Hartshorne. These writers, the reader is led to infer, were unaware that the statement as originally published was "of doubtful authenticity."[35]

These assertions are made without evidence or reference, save for a footnote attached to Ritter's name indicating some doubt as to whether he had used Kant's statement.[36] Since no evidence is given to show that either Hettner[37] or Hartshorne[38] founded their views of geographic method on Kant's statement, the reader

[34] Kant's work in geography, which included not only the elementary lectures he offered throughout his teaching career but also research studies in the earlier years when he devoted himself to scientific work, has been evaluated by a number of German geographers [*cf. 1:* 38]. Their conclusions are not correctly expressed by the phrase "a poor geographer," if indeed such a phrase could ever be considered appropriate in a learned jounal.

[35] All informed students were aware of this doubt, since Kant's lectures were published almost simultaneously in two quite different versions. We do not know which edition Ritter may have read. Hettner asserts he did not use either in drawing up his own statement. Hartshorne did use Rink's edition but the inference the reader is led to draw from the footnote concerning Adickes' investigation of Kant's text—namely, that this work is not mentioned in *The Nature of Geography*—is false. The Bibliography of that volume lists not one but three such studies by Adickes, and the listing of Rink's edition of Kant's lectures refers to "footnote 2 in the text," a note of over a page in length, explaining fully the conclusions of Adickes concerning the degree of authenticity of different parts of Rink's edition. This footnote also states that in translating from Rink's version, I used Adickes' recommendations to enter corrections in Rink's edition, whereas the same passage in the critique is translated directly, but somewhat freely, from Rink and thus provides a less reliable version. The version published in *The Nature of Geography* is the most nearly authentic record yet published of what Kant probably said [*1:* 134f.]. See also footnote 42.

[36] Ritter did not quote Kant; if, as is possible, he borrowed part of Kant's idea and language, he did not mention Kant's name [*1:* 135f.].

[37] Hettner, if we may accept him as an honest writer, did not base his methodology on Kant's statement, since he was not aware of that statement until after he had written his own [*1:* 140, based on Hettner's statement of 1905, *16:* 551]. Only in the re-publication of his statement, a score of years later, did he add a quotation of part of Kant's statement [*2:* 115].

In sum, prior to 1927 when Hettner's concept was already widely accepted among geographers in Germany and several other countries, Kant's statement had not been quoted with his name. If his idea had been passed on in some indirect way, it did not carry the weight of his philosophical reputation.

[38] The first full quotation of Kant's statement appeared in *The Nature of Geography*, but the cornerstone of methodology in that work is clearly Hettner, regardless of Kant [*1: cf.* 134f.

might properly question the relevance of the entire discussion of Kant. Even if he accepted the assertion that Hettner, and hence Hartshorne, had to some degree based their concept on that of Kant, he is given no basis for determining the degree of relationship. If he follows the text uncritically, he is deceived into supposing that if Kant's statement, which is quoted in full, is not acceptable, then the views of Hettner and Hartshorne on the same topic can be dismissed as invalid without examination or reference.

Following the quotation of Kant's statement, already labelled as "unfortunate," the critique raises two objections, each based on an unstated inference. The first presumes that in saying "we can refer our empirical perceptions either according to conceptions or according to time and space where they are actually found," Kant supposed that such a division could be an absolute separation. This is called "untenable": "It simply is not true that the systematic disciplines . . . abstract from or otherwise neglect the spatio-temporal coordinates of the objects they study." As an example, the only example, the critique considers astronomy, presuming that to be a "systematic" science, without telling the reader where Kant placed astronomy in his division.[39] Neither here nor later is any statement or reference offered to indicate how any of the students who are alleged to have followed Kant handled this question.[40]

The second argument reads: "We noticed that the resulting notion of geography is descriptive in the narrowest sense of the term. . . . Kant thought that there were no laws either of geography or of the socio-historical process." The sole antecedent I can find for the phrase "we noticed that" is the single word "description," which comes to us in translation from a text described in the footnote as "of doubt-

and 137–144]. The presentation there of views of Kant, Humboldt, and Hettner in chronological order and the comments made concerning each of the statements, do not permit a definite answer to the question as to which of these statements was originally influential in determining the views of the author of that volume. Not trusting to memory, I find that in the first methodological study I published, in 1935, I wrote of the comparison of geography and history which Hettner had presented and added that, according to Hettner, Kant had come to "essentially the same conclusion." The footnote reference to Kant's writing is stated as derived from Hettner. "Recent Developments in Political Geography," *American Political Science Review*, 29 (1935) p. 800.

[39] If the writer of the critique read more than the few pages containing the passage quoted he could hardly have missed the answer to this question. The last paragraph of Kant's introduction speaks of "Mathematical Geography, which considers the form, size, and movements of the earth and its relations to the solar system" [*5:* § 5]. The discussion of these topics in the following lectures [§ 7–10] demonstrates that Kant regarded astronomy as part of his "physical" classification of knowledge, according to time and space, rather than as one of the systematic sciences.

[40] All the other students with whom we are concerned—Humboldt, Ritter, Hettner, and Hartshorne—recognize astronomy as a space-science similar to geography rather than to the systematic sciences [*7:* 50; *1:* 141f.]. That one is not to expect sharp lines of distinction among the sciences is clearly indicated by Hettner's examples of studies that "occupy an intermediate position between the systematic and the historical sciences" [*1:* 141]; likewise, he repeatedly stated that the systematic sciences include the study of "distribution by place" as a characteristic of the objects they study [*1:* 127].

ful authenticity." No attempt appears to have been made to determine what meaning Kant assigned to the word he presumably used.[41]

Much the greater part of the discussion consists of what is called "historical criticism," but is obviously no more than pure conjecture: that "when Kant wrote the passage in his youth [age not stated but a footnote places the time as "before 1756"] he had probably not yet undergone the full impact of Newtonian science . . ."; "accordingly, he thinks . . ."; "one may well doubt whether he would still have written this passage . . . in his maturity"; "the great contributions of . . . Hume . . . had not yet penetrated into the academic precincts of provincial Koenigsberg," etc. There is no need to publish guesswork concerning the intellectual background and life of Immanuel Kant. Authoritative biographies and critical studies of his scientific work are readily available.[42]

Humboldt's Kosmos (234–235). The possible relevance of this half-section to the theme of "exceptionalism" appears late in the discussion: "It is unfortunate that Hettner,[43] and following him, Hartshorne,[44] mistake this discussion [of cos-

[41] Throughout all of Kant's first volume (the second, to be sure, is on a very different, and inferior, level, explained in fn. 42) the reader observes repeatedly Kant's concern to demonstrate the cause (*"Ursache"*) of a phenomenon reported first in purely descriptive form—whether of variations in the saltiness of seas [§ 21–23], of ocean currents [§ 30], of tides [§ 33, after Newton], of the origin of sand dunes [§ 40], of earthquakes [§ 49–51], of natural levees [§ 59], or the laws governing winds [§ 68–71], or, more rarely, generalizations explaining the peculiarities of peoples of particular types of areas [§ 43]. To call this material "descriptive in the narrowest sense of the term" would be downright falsification; we must assume therefore that the critic did not read the work he criticized. None of the later writers who stated views similar to Kant's suggest that geography, under that classification of sciences, is limited to "mere description."

[42] The guesses in this case could hardly be further from the facts. In 1755, Kant, at the age of 30, had published a study of astronomical theory, with the sub-title "An Essay on the Constitution and Mechanical Origin of the Whole Universe, Treated According to Newton's Principles." Later critics found this work had carried Newtonian principles beyond Newton and antcipated the work of LaPlace [*20:* xviiff., xlvff.].

Further, the erroneous guess concerning what Kant may have thought in his youth, and all the discussion that is founded on it, is entirely irrelevant. Kant's statement about geography is *not* dated by Adickes as "before 1756," as is said in the footnote in the critique, but from 1775. Whoever did the research for this item misread what Adickes wrote; he also overlooked the later supplement of Adickes' study, though both are mentioned in the more complete and more accurate footnote on the subject which occupies over a full page of *The Nature of Geography* [*1:* 38f.). In both studies Adickes found that the latter three fifths of Rink's publication of Kant's lectures dated from before 1759, but the first two fifths, including all the statement quoted, was based on a full and fairly reliable record of the lectures given in the summer semester of 1775 on which Kant himself had made marginal notes at some later date [*8:* 278; *19:* 10f., 67].

[43] We do not know that Hettner ever even read this discussion of Humboldt's. As stated in *The Nature of Geography*, "he did not then [when he wrote his own statement] or later realize the close similarity to Humboldt's views [*1:* 140; the sentence was based in part on personal correspondence]. In his "History of Geography" Hettner barely mentions the *Kosmos* as "not actually a geographic work" [*2:* 86] and says of Humboldt in general that he "did not concern himself with the methodology of geography" [*2:* 85], a view generally held among

mology—from the introductory chapter of Humboldt's *Kosmos*] for one of the methodology of geography. Humboldt is not really an authority properly cited in support. . . . One must not be misled. . . ."

No evidence is offered, and no reference to any evidence, to show that either of the writers named did take this discussion of Humboldt's in the sense indicated, or that, if he did so, it formed an important element in the presentation of his methodology. Yet on this question depends the relevance of this portion of the critique.[45]

The reader is not told what, according to Humboldt, was the relation between cosmology and geography. To say that geography is a science searching for laws whereas cosmology is "descriptive" expresses a difference, but does not refute the possibility of a basic relationship in scope of the field.[46] It is no help to the reader to say that "it is forgotten that Humboldt himself in his other writings distinguished very well between cosmological description on the one hand and geography on the other" when no other writings of Humboldt are named anywhere in the essay.[47]

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geographers until Döring's dissertation of 1930 drew attention to the methodological statements scattered through Humboldt's many writings and compared them to those of Hettner [*18:* 166–168].

[44] Hartshorne did not "follow Hettner," but rather was the first student to demonstrate the similarity of ideas of the three writers—Kant, Humboldt, and Hettner—concerning the position of geography among the sciences. Further, in presenting Humboldt's view [*1:* 135], I did not draw from the discussion in the *Kosmos.* I merely listed that as the most detailed of his several discussions of the same idea and actually presented only what he had written in his first scientific publication, in 1793, a statement he republished twice during his life-time [*17*]. This basic statement, which deals only with geography, not cosmology, is not mentioned in the critique which nevertheless baldly asserts that I misunderstood Humboldt.

[45] The two previous footnotes show that it is completely irrelevant. The reader may therefore, if he prefers, skip the remaining discussion of this section which serves only to demonstrate that this irrelevant portion is also completely false.

[46] There should be no difficulty in determining what Humboldt said on this question provided the reader of his *Kosmos* notes carefully its definitions of terms. The word *"Geographie"* is used only occasionally because like many geographers of his period Humboldt preferred the more Germanic form, which is literally identical—*"Erdbeschreibung."* To express approximately the distinction we make between systematic and regional geography, he spoke of *"physische Erdbeschreibung"* and *"vergleichende Erdbeschreibung"* or *"specielle Länderbeschreibungen"* [*4:* viii, 39, 51, 52, 54, 56, 59, 60, 61]. The use of "physical' by geographers of his period seems strange to us, who commonly do not recognize the strangeness of the restriction we have imposed on the word. Humboldt's use of it may perhaps best be understood from the term he used in earlier writings in French, *"physique du monde"* [*18:* 15, 18]—i.e., all empirical observations of the phenomena of the world organized in a unitary system of interrelationships, as phenomena are studied and organized in physics.

Specifically Humboldt identified his *"physische Erdbeschreibung"* with the *"Geographia generalis"* of Varenius and distinguishes it from the *"vergleichende Geographie"* (regional geography) of Ritter's *"Erdkunde"* [*4:* 60 and fns.]. Its relation to cosmology is very simple: *Kosmos,* or, as indicated in the subtitle of his work and most commonly in the text, *"physische Weltbeschreibung"* (*Welt* in the sense of universe), consists of two coordinate parts, a celestial portion and a terrestrial portion—the latter is *"physische Erdbeschreibung"* (systematic, or general, geography) [*4:* 50, 56].

[47] Examination of Humboldt's statements about geography in numerous other writings demonstrates, as Döring's intensive study revealed [*18:* 46–51] and as was reported in *The*

The apparently reasonable and moderate tone of the discussion serves to conceal the intellectual impudence of its conclusions. A critic of unknown competence is asserting to the geographers of the world that scholars of established competence, including one regarded by his German colleagues as pre-eminent in methodology, "misunderstood" what Humboldt had "patiently" and "clearly" explained. What evidence is offered to justify this extraordinary assertion? The reader is never told what Humboldt actually said.[48] There are no quotations. The statements purporting to represent what Humboldt said are obviously not acceptable as proper paraphrases. We can hardly suppose that any scholar would describe a major work of his own in the following manner: "Cosmology is . . . at best thoughtful contemplation of the universe. Such contemplation has its place. . . . It is descriptive, something like an art." Yet these are the only positive statements the critique presents from Humboldt's introduction. The citation to one page of Humboldt's work is not adequate to persuade the intelligent reader that he is being given more than the personal reaction to Humboldt's discussion.[49] On what basis then is the reader to decide who understood, who misunderstood Humboldt?

Nature of Geography [*1:* 76f.], that his views on this subject were notably consistent throughout his career and that cosmology differed from general geography (systematic) only in that it included the whole universe rather than just the earth.

The reference in the critique to what Humboldt may have said about geography "in his other writings" is not necessarily a pretense; the writer of this section may have had in mind the statements credited to Humboldt in the first section without realizing that the only source for those was the same source which in this section he says is not to be taken as a discussion of geography. This is by no means the only such inconsistency in the essay.

[48] Humboldt's discussion of his concept of cosmology is found in a chapter significantly entitled *"Begrenzung und* wissenschaftliche *Behandlung einer physischen Weltbeschreibung,"* under two sections also significantly entitled: *"der Begriff und die Begrenzung der physischen Weltbeschreibung, als* einer eignen und abgesonderten Disciplin" and *"der objectiven Inhalt, die reale* empirische Ansicht *des Natur-Ganzen in der* wissenschaftlichen *Form eines Natur-Gemäldes"* [*4:* 50–69, emphasis added]. Almost no use is made of this discussion in the statements presented in the critique.

[49] Careful comparison of texts demonstrates that the reader is in fact being given something very different, namely, a fabrication composed of pieces of sentences drawn from widely separated pages and put together without concern for the original meaning. The resultant product is a travesty of what Humboldt actually wrote concerning the work he regarded as the crown of his career. Nowhere in his text does Humboldt state or imply that his cosmology differs from other sciences in concern for the search for laws; the contrary is clearly indicated in many places [*4:* 3, 32, 37, 68 *et al.*]. Any reader who attempts to check the paraphrases in the critique would have difficulty in comparing them with the original since these are to be found not on the one page cited but in sentences scattered through nearly forty pages—in the following order: 31, 66, nowhere, 28, 50, 51. In each case the statement in the critique is so distorted from the original as to give an entirely altered meaning, even the opposite meaning of the original. Two examples should suffice.

Critique: "Cosmology is *not* a rational science but at best a thoughtful contemplation of the universe. Such contemplation has its place." (Italics as in the critique.)

Humboldt: *"In meinen Betrachtungen über die wissenschaftliche Behandlung einer allgemeinen Weltbeschreibung ist nicht die Rede von Einheit durch Ableitung aus wenigen, von der Vernunft gegebenen Grundprincipien. Was ich physische Weltbeschreibung nenne* (*die ver-*

Like the discussion of Kant's statement, this limited and obviously dubious presentation is bolstered by what is termed a "historical answer," a biographical analysis—including even "the rationale behind Humboldt's enthusiasm"—without reference to any of the many authoritative studies of Humboldt's life and works.[50]

Summary. This section claims to destroy or throw out of scientific literature certain works of the two most eminent persons ever associated with the field of geography. It ignores, or is ignorant of, all previous studies of these works or their authors by scholars of established competence. It ignores the normal standards of critical scholarship and in effect offers nothing more than personal opinion, thinly disguised as literary and historical analysis.[51]

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gleichende Erd- und Himmelskunde), macht daher keine Ansprüche auf den Rang einer rationaller Wissenschaft der Natur; *es ist die denkende Betrachtung der durch Empirie gegebenen Erscheinungen, als eines Naturganzen."* [*4:* 31; emphasis as in original; *cf.* also 68f.]

Critique: "It should not be studied without a good previous training in such systematic sciences as physics, astronomy, chemistry, anthropology, biology, geology and *geography.*" (Italics as in the critique.)

This sentence has been composed of parts of three scattered statements, each dealing with a different topic. The sentence expressing the main thought in the statement names but three of the fields listed in the paraphrase, not including geography [*4: 28*]. Much farther on, Humboldt says he will explain the relation of cosmology to other fields [50] naming four fields including *"vergleichende Geographie oder Erdbeschreibung"* (regional geography), and this distinction is discussed farther on [53f., 60 and fn. 8, p. 75]. Before that, however, he gives a short discourse on the manner in which names of disciplines had varied in course of time and in different countries, listing without discussion six names, including anthropology and geography [51]. This is the only one of the three lists that includes those two names. The tone of this discourse, indicating its incidental nature, is best shown by part of his final sentence: *"In der Sprache einer der gebildesten Nationen Europa's ist sogar . . . Physik kaum von der Arzneikunde zu trennen."*

[50] In this case, Humboldt makes it unnecessary for anyone reading his introduction to indulge in conjectures concerning the relation of his *Kosmos* to his previous scientific work. In the preface and in numerous other passages he explains that the purpose of his scientific studies had always been directed towards this goal. Immediately following the statement in which he explained that his cosmology would not be a "rational science of nature," a statement which we know the writer in the critique used, or misused, Humboldt continues: *"In dieser Beschränktheit allein konnte dieselbe, bei der ganz objectiven Richtung meiner Sinnesart, in den Bereich der Bestrebungen treten, die meine lange wissenschaftliche Laufbahn ausschliesslich erfüllt haben"* [*4:* 31]. Two pages beyond the page cited in the critique, the following statement is found:

"Dem Charakter meiner früheren Schriften, wie der Art meiner Beschäftigungen treu, welche Versuchen, Messungen, Ergründung von Thatsachen gewidmet waren, beschränke ich mich auch in diesem Werke auf eine empirische Betrachtung. *Sie ist der alleinige Boden, auf dem ich mich weniger unsicher zu bewegen verstehe. Diese Behandlung einer empirischen Wissenschaft, . . . schliesst nicht aus . . . das stete Forschen nach* empirischen Naturgesetzen." [68, emphasis as in original.]

Humboldt's relation to Goethe and the romantic movement of his time could be documented from reliable sources, but not as support for the special view presented in the critique concerning his purpose in writing the *Kosmos.* On the contrary, this spirit permeated Humboldt's scientific writings throughout his life [*1:* 64f.]

[51] The statements alleged to have been found in the sources listed have been shown to be almost without exception fallacious; this section is therefore well-nigh totally false.

Section III of the Critique

Section III falls into three portions, not specifically indicated in the article: (1) what appears to be a definitive and completely destructive critique of Hettner's views on geography; (2) similar critique of the views expressed in *The Nature of Geography;* and (3) a reconsideration of Hettner's views which places them in a quite different light and condemns *The Nature of Geography* for having failed to present them correctly.

The first discussion of Hettner's position (235–238). The section opens with statements purporting to be historical fact, but which stand as bald assertions without explanation or evidence. "Hettner's great prestige helped to perpetuate the confusion . . ."; in the absence of any consideration of chronological order, the statement has no more validity than would the reverse: by perpetuating confusion, Hettner attained great prestige.[52] "Invoking the formidable authority of Kant" repeats the assertion made without evidence in the previous section.[53] Equally without evidence are the following sweeping statements condemning Hettner's position before it is even stated:[54] "on the basic fallacy" of "the exceptionalist claim in analogy to history," he "forced upon geography the principles of natural history or cosmology"; "spurious similarities between history and geography were constructed";[55] and "geography was thus laid open to the invasion of a whole host of nonscientific not to say antiscientific ideas."

The "whole host" prove to be four. To make Hettner responsible for these[56]

[52] Hettner's impact on geographic thought and his prestige alike resulted from the long series of methodological treatises regarded as "classics" by German geographers; it was in one of the first of these, in 1905, that he published his statement on the nature and methodology of geography [*1:* 137–140].

[53] In the original statement of his position, Hettner mentions Kant only in a footnote. Not until his volume of 1927 did he quote, and then briefly, from Kant's statement [*1:* 140]. The phrase in the critique could only be applied to the manner in which I introduced Kant's full statement in my volume [*1:* 134].

[54] In this entire first discussion of Hettner's views, there is no evidence to indicate that any of the statements concerning Hettner's views, prior to the last two paragraphs, are based on Hettner's writings. Similarity in language, order of presentation, and, notably, the discussion of my translation of *"Wissenschaft"* which appears inserted out of place, confirm the impression that in this portion of the critique, as in the first section, the discussion of Hettner's views is not based on the original source cited but on the presentation in *The Nature of Geography.* This in itself need not lead to error, but on the erroneous assumption that my study added essentially nothing to Hettner's statements, numerous statements are put in Hettner's mouth which were not said by him, but by various other students, or by myself—in spite of the fact that the sources are specifically indicated in that volume.

[55] This evidently refers to a section in my volume, immediately following presentation of Hettner's position, on "The Importance of the Comparison of Geography and History" [*1:* 144–146]; this discussion has no counterpart in Hettner's writings but draws largely on Kroeber, Finch, Sauer, Barrows, William Morris Davis, Crowe, and Fairgrieve. But there is no justification for the assertion that this discussion uses the analogy with history to derive logical conclusions about the characteristics of geography.

[56] Two of these were specifically discussed and opposed by Hettner, and in each case that fact had been reported in *The Nature of Geography*—on "antianalytical holism" [*1:* 138, 276]; on "appeal to the intuition and artistic touch of the investigator" [*1:* 133, 219].

is to assume they were not present in the thinking of geographers before he wrote.[57] It is as though there had been a vacuum in geographic thought between the time of Humboldt and Ritter and that of Hettner—as indeed is more specifically implied in the introductory list of "major" methodological contributions. The statement that "some at least of these points must now be taken up in detail" is an exaggeration: only one is considered, "the typically romantic argument from uniqueness." This discussion occupies all of the next two pages (236–237).

The discussion starts with a paragraph (235f.) labelled at beginning and end as "a brief statement of Hettner's position," in contrast to "criticism" which is to follow in the next paragraph. One can hardly suppose, however, that Hettner said of his own subject: "such explanation is, therefore, unlike all scientific explanation. . . . The best one can hope for is. . . ." Evidently these phrases represent the insertion, without distinction, of criticism of Hettner's views into what purports to be a fair statement of his position. Actually not over six lines are given to presentation of the basic position of Hettner's methodology, although that is the main target, or the foundation of the main target (*The Nature of Geography*), of the entire critique. Finally, when one reads the half dozen slight sentences purporting to represent Hettner's views,[58] one must wonder how anyone who expressed such views could have achieved any prestige whatever among his colleagues. In all probability, one would conclude the statements are not a fair representation of the original, much more probably distortions designed to reduce the original statements to a target easily subjected to attack.

In the paragraph purporting to state Hettner's position, it is asserted that my translation of Hettner's *Wissenschaft* as "science" "has been instrumental in obscuring the basically antiscientific bias of this doctrine." But in the absence of any consideration of what meaning Hettner gave the word *"Wissenschaft,"* as shown by the context of his discussion, or of the meaning assigned the word "science" in *The Nature of Geography,*[59] this assertion, and the accompanying lecture on translation, may be dismissed as merely amusing.

[57] The question of the importance of studies of the unique in geography was under discussion among German geographers when Hettner was an unknown student [*Geographisches Jahrbuch,* 8, 1880, pp. 539–549]. Indeed the problem is implicit in Ritter's insistence on the study of individual cases [*1:* 74]

[58] These few sentences, claiming to present Hettner's position are not only inadequate but in many respects erroneous in comparison with the source, which is evidently not Hettner directly, but *The Nature of Geography* [*1:* the first three are from pp. 140–145; the remainder from pp. 378–397]. The first sentence is curiously meaningless: "Both history and geography are essentially chorological"; "history" here has been substituted for "astronomy" [*1:* 141].

The second group of sentences cannot be regarded as even abstractions of my statements (and they bear no relation to any of Hettner's) but appear rather as erroneous impressions that my discussion may have made on the mind of a careless student. Thus the statement that "in geography no two phenomena and no two regions are alike" completely destroys the contrast developed between our capacity to establish generic concepts of individual phenomena [*1:* 384] and the necessity of considering every region as unique [*1:* 393–396].

[59] The assumption that there is general agreement among students of science on the meaning of the word "science" is perhaps the most elementary error in methodology. My use of the term

The paragraphs labelled as "criticism" of Hettner's position (236–238) carry the reader through a long discussion of opposing kinds of work in history, before anything is said about Hettner's view of geography. It is as though Hettner had defined geography not in its own terms but simply by stating that it was like history, and to know what he means by geography we must determine what kind of history he had in mind and deduce the conclusion for geography. If the reader can believe that this is a proper method for determining what Hettner thought about geography, can he accept the conclusion to which the critique comes? "The historian who goes, as all historians do, beyond mere fact finding is comparable to the regional geographer. . . . In trying to understand or, better, explain the facts the historian does exactly what the regional geographer does in his region. . . . Turned this way Hettner's analogy is acceptable. But then we have merely followed his words, not his meaning. What is this meaning?" The answer, says the critic, is "historicism" which he has described as something different from "what all historians try to do."

For evidence justifying the conclusion that Hettner was as thoroughly confused as this would indicate, we must look to the two remaining paragraphs which complete the destructive treatment of Hettner's position.

"Historicism," we are told, is "the belief that by merely arranging the past events in their temporal order some sort of 'meaningful' pattern . . . will appear.[60] To understand anything it is necessary *and sufficient* to know its history" (underlining added); "in the historicist interpretation the 'genetic method' yields nothing." Then follows the accusation: "Through Hettner, it (the antiscientific spirit of historicism) has penetrated geographical thought." Evidence to justify the

in *The Nature of Geography,* which is not peculiar to myself but rather was obtained from writings by outstanding students of the nature of science, is explained at length in that volume, together with a specific discussion of the word *"Wissenschaft"* [*1:* 366–378]. Any student who wishes to know what meaning is given these terms in my volume should have no difficulty in finding these discussions, in a chapter entitled "What Kind of a Science Is Geography?" under the headings: "What's in a name?" and "The character of geography in relation to the general nature of science." All this is ignored in the critique.

[60] This statement, of unknown origin, is to be compared with the following statement ascribed to Hettner in *The Nature of Geography:* "Geography requires the genetic concept but it may not become history" [*1:* 184]. Indicated there as the source of the statement is the section of Hettner's volume entitled: *"Die Auffassung der Zeit"* in which is found the following clause expressing the diametric opposite of the view ascribed to him in the critique: *"dass sie [Geographie] nicht den Ablauf in der Zeit als solchen verfolgt—allerdings wird gerade diese methodische Regel noch oft genug übersehen"* [*2:* 132].

There is however a partial quotation from Hettner in *The Nature of Geography* which may conceivably represent the source of the critic's statement: "genetic explanation to become historical narrative." If this is the source, the research notes must have been strangely shuffled. The quotation occurs in a discussion of Spethmann's work criticizing Hettner's view of geography as "static"—the work cited on the first page of the critique. Commenting on Spethmann's demonstration of his "new dynamic view" of geography in his study of the Ruhr area, I wrote: "The reader will find ample evidence of the way in which a geographer is led out of his field when he permits 'genetic explanation to become historical narrative,'" and cited Hettner as source of the concluding portion of the criticism [*1:* 177].

accusation is presented in three sentences: "Characteristically, the very first sentence of Hettner's methodological work reads: 'The present can always be understood only from the past.'[61] Also, his work on social and cultural geography exemplifies the genetic method applied to geography. And . . . much of the material is not at all geographical but anthropological, cultural, or political." There is no further explanation other than mere naming of three of Hettner's publications. As a final note, without reference or explanation we are told that "among American geographers, Carl Sauer is perhaps the outstanding representative of historicism, building his geography consistently on Hettner's premise stated above" (238).

These minute bits of evidence offered to support the criticism of Hettner depend in part on unwarranted implications. To say in a methodological discussion that much of the material is "not at all geographical" is merely to beg the question. To label a sentence as "characteristic" is an attempt to multiply the evidence with the wave of a wand.[62] Most deceptive of all is the attempt to have the reader think that because Hettner says the historical approach is "necessary," he is saying the same thing as "necessary *and sufficient.*" Without the unwarranted addition of those two words, the entire argument of the previous two pages falls to earth like a pack of cards.

This portion of the critique, purporting to present Hettner's view of geography is shown by careful reading, even without reference to the sources, to constitute a confused and tenuous argument easily recognized as fabrication.

Critique of views of Hartshorne (238–240). The critique of views expressed in *The Nature of Geography* begins with the formulation of a syllogism purporting to represent its "line of thought": "If history . . . deals with unique events and if geography is like history, then geography, too, deals with the unique and must try to 'understand' rather than search for laws" (238). No evidence is introduced, or cited, to show that the syllogism is a legitimate abstraction of what appears in the original.[63]

The critique then "turns to the uniqueness argument as such," but since that argument is not stated, but merely hinted at without reference, and denounced as a "pseudomethodological argument," reading the paragraph is like listening to one end of a telephone discussion. "All this" is then applied to geography by the mere assertion of "the claim that the difference between two 'unique' regions [not pre-

[61] The original reads: "*Die Gegenwart kann immer nur aus der Geschichte ganz verstanden werden*" [*2:* 1]. The changes in translation—the omission of "ganz" and the substitution of "past" for "history" with its implication of "historical development"—produce a significant alteration in the meaning.

[62] The fact that this appears as the first statement in Hettner's volume is not "characteristic" nor necessarily significant. The first part of the volume, as its title indicates, is "The History of Geography" and this sentence is appropriate to explain why that part is included.

[63] I find no passage in *The Nature of Geography* that could form the basis of the syllogism. It is evidently constructed out of erroneous impressions gained from reading certain passages in my volume [*1:* 144–146; 381f.]. These passages present no argument to determine what is done in geography, which is regarded as a question of fact, but rather on the basis of the facts conclude that geography is like history.

viously considered] on the one hand and the equally numerous differences between our two stones [as dropped from Galileo's tower] on the other, is again a matter of degree."[64] The phrase "equally numerous differences" is a smooth avoidance of the critical difficulty—are regions comparable to stones as real objects or phenomena?[65]

The only other criticism appears to demonstrate that the author of *The Nature of Geography* did not understand the elementary principle that a scientist, in analyzing a particular concrete situation, applies not one law but many. To accept this criticism the reader must accept the critic's word that Hartshorne actually "challenges the social scientist to produce *a single law* that would explain as complex a situation as the geography of New York Harbor," and that he insists on considering that place as unique merely on the grounds that "there has and never will be a region or location *exactly like* New York Harbor" (italics added in both quotations). There is no indication as to where in *The Nature of Geography* the original discussion is to be found.[66]

The final long paragraph purporting to summarize the views expressed in *The Nature of Geography* is unusual in this essay in that it includes three full sentences in quotation and gives a page reference to one statement presented in paraphrase. A thoughtful reader, however, might well wonder whether a work that has attained some respect in the profession could actually contain such extraordinary statements as those alleged in this paragraph to have been found in it. If he was thereby led to examine the paragraph critically, he might note that the quoted sentences are of minor importance in comparison with sweeping assertions for which no page citations are given and that anyone who attempts to check those assertions against the original statements must expect to search through nearly ninety pages

[64] The discussion of this topic in *The Nature of Geography* which is under attack in this and the following paragraphs of the critique can be definitely located [*1:* 378–397] by the echoes of numerous specific items, including: Galileo's law [378], the comparison of the social and physical sciences [378–381], the case of New York Harbour [382]; "heart of geography" [391]; and "essentially idiographic" [396]. Had these pages been cited and any reader thereby led to look into this section of the original writing and observe for himself the distortions and omissions in the critique, this entire discussion of my views would reveal itself as falsification. Indeed the very title of that section in *The Nature of Geography,* "Generic Concepts and Principles in Geography," would give the case away.

[65] The latter portion of the section named in the previous note [*1:* 395f.] discusses the problem of the "uniqueness" of regions, basing its conclusion on the argument—for which an entire previous chapter provided the foundation—that an area, or region, is not a phenomenon. This is ignored in the critique, which simply asserts the opposite.

[66] The example of the port of New York appears in my text in a consideration of generic concepts, where there is no discussion of scientific laws, whether one or many [*1:* 382f.]. "Never . . . exactly like" is not a paraphrase, but a change in meaning of my phrase "no other city of the type."

The other examples mentioned in the same paragraph, concerning the "prediction of election results" or the future of the Argentine government, are not derived from my writings—though I would be willing to accept them—but from one of the articles by Platt, listed later in the critique [*12*].

of text, judging from the citations that are given (from page 373 to 461). Further, he might note the strange gymnastics which the original author is alleged to have performed: following a quotation and citation from pages 432–433, the critic asserts, "thus he comes after lengthy discussions to the conclusion . . .," cited from page 373!

More detailed examination would demonstrate that no single sentence, other than the quotations, can be accepted as reliable. The paragraph opens with what may appear to be merely a compliment: "Hartshorne, like all vigorous thinkers, is quite consistent." Whatever value such loose generalization might have as compliment is destroyed some pages later where the same author is accused of major inconsistency (in reference to "holism," p. 246). In reality the statement is part of an involved argument. The previous paragraph raised the rhetorical question: "Should we really reject sociology. . . ." In the opinion of the critic, the author of *The Nature of Geography* if he is consistent must say "yes" to this question; by asserting that he is consistent, it is proved that he says "yes," thus justifying the assertion, "He does, in fact, reject all social science," an accusation that otherwise would hang in thin air.[67]

The remainder of the same sentence states that the author of *The Nature of Geography* "is particularly sceptical of the future of sociology." To say that I made such a statement about a field in which I have not studied is to brand me, at least in the eyes of all sociologists, as presumptuous and arrogant. No page reference is given.[68]

In the next pair of sentences, a statement of fact concerning the degree to which phenomena are unique in geography is quoted[69] as basis for a conclusion, which however is presented only in paraphrase: "Hence generalizations in the form of

[67] The discussion of work in the "social sciences" in the section on "Generic Concepts and Principles" in *The Nature of Geography* demonstrates acceptance not rejecton. There is, of course, no source in that work for this fantastic statement; as it stands in the critique it is a clear falsehood. No doubt the writer intended a meaning more properly expressed by the phrase "in effect" rather than "in fact"; this is not the only instance of loose use of this word. If the phrase means merely "in effect," the statement is simply an opinion, based on a semantic disagreement over the meaning of the word "science," but this devious reasoning is hidden from the reader.

[68] The only reference to "sociology" in the pertinent section of *The Nature of Geography* is its inclusion, qualified by the word "perhaps," along with economics, the biological sciences, and psychology as fields in which the emphasis is on the search for universals (including scientific laws) rather than the unique, though "to a lesser extent" than in physics and chemistry [*1:* 380]. The only other references to "sociology" in that volume are incidental and are not relevant to this topic [*1:* 191, 214].

More likely, the statement is derived, through careless note-taking, from the somewhat (not "particularly") skeptical discussion of "sociological geography," in which however the word "sociology" is not to be found [*1:* 404].

[69] The sentence is quoted correctly, but had the quotation included the immediately preceding and following sentences the reader would have been given a very different impression. Further, in the original this is but one of the six reasons listed as making it difficult to predict with certainty in geography [*1:* 432f.].

laws are useless, if not impossible, and any prediction in geography is of insignificant value."[70]

The second quotation is a sentence in which I suggest that "both history and geography might be described as naive sciences[71] and explain the particular meaning of the word "naive" in this thought. The critic treats this as a firm definition of geography as "naive science"; reaches back to Kant's statement referring to geography as "description"; transfers this literally to Hartshorne, "if we accept his meaning of science";[72] and thereby arrives at the logical conclusion that "for Hartshorne it [geography] . . . is naive description"—all with no recognition of the change in meaning of the word "naive" in the different combination.

This trickery with words is next used to support the argument previously slipped into the reader's mind that "regional studies are for Hartshorne the heart of geography" (again without citation[73]) and to extrapolate from that the implication, necessary to the statements to follow, that systematic geography does not count. Then comes the final conclusion based on the distinction "between idiographic and nomothetic disciplines."[74] "The former describe the unique;[75] the latter search for laws.

[70] Nothing on the page cited [*1:* 433] resembles the first half of the statement; as in the paraphrases of Humboldt's statements, the critic appears to have combined parts of ideas expressed on different pages. Thus the discussion of the uniqueness of areas, terminating on page 396, or the similar discussion on page 446, could be paraphrased as concluding that laws about areas are impossible, but in each case it is also noted that the study of any area does depend on generic concepts and principles (laws). The second part of the statement is evidently a gross exaggeration of a statement from the page cited: to paraphrase "relatively little knowledge of the future of such a degree of certainty as to justify the word 'prediction' . . . [in comparison with] such terms as 'trends' or 'likelihoods,'" into "any prediction in geography is of insignificant value" is to give the reader a false impression of what the original author said.

[71] The sentence is quoted correctly but presented incorrectly as a conclusion "after lengthy discussions." Rather it is presented as an empirical observation of fact [*1:* 373].

[72] As noted earlier (fn. 59), "his meaning of science" is not even considered in the critique.

[73] Presumably the source is the following: "When we consider . . . the areas themselves, can we hope to develop general principles? This question lies at the very heart of geography" [*1:* 391]. Granted that the phrase may mislead the careless reader, as a thread on which to hang a conclusion that the original author considered systematic geography not important, it is too thin. That systematic geography is regarded as of vital importance, an integral part of the field, is demonstrated by the very titles of the final subsections of *The Nature of Geography:* "The character of systematic geography," "The character of regional geography," "The integrated dualism of geography," as well as the passages from which the writer of the critique derived the conclusions presented as though his own, and many others expressing the same thought. In effect, the critic has employed this single figurative expression, used in two different forms on a single page, to destroy many pages of discussion and direct positive conclusions in the text.

[74] "The terminology he uses stems in part from the German historicist philosopher Rickert who distinguishes between idiographic and nomothetic disciplines" (240). Literally the sentence is correct (though I cannot vouch for the application of the term "historicist" to Rickert), but it conceals from the reader the significant fact that while *The Nature of Geography* used Rickert's terminology, it explicitly rejected (in the immediately following paragraph) his theory that the different sciences can be distinguished on this basis: "These two aspects of scientific knowledge are present in all branches of knowledge" [*1:* 379].

[75] The definition in *The Nature of Geography* reads "concerned with the unique" [*1:* 379].

Geography, according to Hartshorne, is essentially idiographic.[76] Whenever laws are discovered or applied one is no longer in the area of geography.[77] All it contributes is facts." As evidence for the last two statements another single sentence is quoted, which in effect says that geography contributes facts to the systematic studies, but neither states nor implies that that is all it contributes.[78]

The reader might well conclude that in all probability the conclusions purporting to come from *The Nature of Geography* would, on investigation, prove either not to be there at all, or to be there in form so different as to constitute radical difference in meaning.[79]

Hettner reconsidered and Hartshorne condemned (240–241). The final portion of this third section returns to a consideration of Hettner's views, to reveal that Hettner also presented views strongly supporting the nomothetic position of geography—i.e., a science seeking laws. The inconsistency is not in the critique, it is claimed, but in Hettner, who "undoubtedly advocated at different times and at different places the idiographic as well as the nomothetic conceptions of geography." But caught between two irreconcilable philosophies, of "historicism" and "the positivist philosophy of science," he was a "victim of this sterile struggle."

The separate discussion of these two aspects of Hettner's thought, divided by the discussion of Hartshorne's views, is evidently presented in this way to establish the conclusion that *The Nature of Geography* depended entirely on one side—the wrong side—of Hettner's thought, whereas "Isaiah Bowman for example," among American geographers, did not overlook the other side of his thought.

The specific charge against Hettner, that he advocated opposite viewpoints "at different times and in different places" is actually refuted by the second of the two quotations[80] presented as "amounting to a programmatic declaration in favor of the

The word "describe," in the usage employed throughout the critique, eliminates all interpretation, including interpretation by laws; the original does not. This apparently slight alteration leads to major differences in conclusion.

[76] This is a fifty percent falsification. The conclusion in *The Nature of Geography* is that "areas, as such . . . can only be regarded as unique" [*1:* 396]; previous discussion of generic concepts and principles in systematic geography had led to the conclusion that "to some degree, therefore, geography may be called a generalizing or nomothetic science" [*1:* 384].

[77] No such conclusion can be found in *The Nature of Geography,* not even in respect to regional geography, in which, it is repeatedly asserted, the laws developed in systematic geography are applied [*1:* 396f, 446, 464, 467].

[78] The quotation is ripped out of a paragraph listing not merely this one, but many contributions of geography, not to knowledge as a whole, but specifically "to the systematic sciences" [*1:* 461]. The effect of this quotation is thus doubly to deceive the reader.

[79] The previous footnotes have supplied that proof; this portion of the critique is completely without validity.

[80] It would also have been refuted by the first passage, had that not been tampered with in translation. Two alterations might represent instances of minor carelessness; a third cannot be explained on that basis. All occur in two critical sentences, translated to read: "Each situation is individual, unique, as a result of which no law will be able to explain the totality of a given phenomenon as in the natural sciences. There will always be a rest which must be explained under a different law or will remain unexplainable . . . ." The original for "natural sciences" is *"abstrakten Wissenschaften,"* a term Hettner used consistently for such fields as

conception of geography which is here advocated"—the nomothetic conception. The essence of this quotation is stated entirely in the first sentence, from which the reader's attention is distracted by the inclusion, with underlining, of sentences that merely amplify the second part of that key sentence: "As much as the individualizing method is appreciated and needed, one must say that geography received only through the generalizing method its stricter scientific character." In sum, Hettner in a single sentence advocated the use of both methods in geography.[81]

The greater part of the discussion in the critique offers no evidence to show that Hettner was inconsistent, but rather presents a plausible historical explanation for a fact in itself not established. This is concocted by much the same method as was used in the previous section to dispose of the alleged views of Kant and of Humboldt's *Kosmos,* by conjectures out of thin air without reference to source material. These guesses are bolstered by analogy with one other writer who is known to have resembled Hettner to the extent that both lived and studied in Germany at more or less the same time. Whether the analysis of Karl Marx is sound, few readers of the *Annals* would be competent to judge. They should be competent to judge the appropriateness of including the analogy in a geographical journal.

That Bowman, in contrast to myself, did not overlook the nomothetic side of Hettner, and therefore appears to support the conception of geography advocated by the critique is evidenced solely by a sentence which carries no mention either of Hettner[82] or of geography. It is merely a very common statement of "the

physics or chemistry, never for the biological sciences, astronomy, or geology. This error causes Hettner to say something that would be absurd. In the next sentence "a rest" is much weaker than the original *"individuelle Reste"* (individual remainders). The final four words of the sentence, "or will remain unexplainable," show no relationship to the original expression they claim to translate: *"oder als individuelle Besonderheiten erfasst werden können."*

This quotation consists actually of two passages from separate sections of the original article, put together in reverse order [the first two paragraphs from *3,* 412f., the last two short statements from p. 405]. The addition of the latter part appears to serve no purpose, but does distract attention, all the more because of the addition of italics, from the critical sentences that conclude the main passage, the sentences whose meaning has been destroyed by false translation.

[81] Hettner did discuss the topic in many different writings, from 1905 to 1929, but he said essentially the same thing every time, namely, that geography must use both methods of study. The section discussing the question in his 1927 volume, the section from which the second passage quoted in the critique is taken, is significantly entitled: *"Individualisierende und Generalisierende Auffassung"* [*2:* 221–225]. The section concludes, as did the similar section of his essay of 1905, with sentences that defy misunderstanding: *"Die Geographie ist, wie es schliesslich alle konkreten Wissenschaften, wenn auch in verschiedenem Grade, sind, idiographisch und nomothetisch zugleich. Sie ist idiographisch, insofern ihr Ziel, die Kenntnis der Tatsachen, individuelle Wirklichkeit ist und sie notwendigerweise mit deren Feststellung und Beschreibung beginnen muss. Sie ist generell und nomothetisch, insofern sie sich zur Beschreibung der systematisch gebildeten Gattungsbegriffe und zur Erklärung allgemeiner Gesetze bedient, wobei jedoch immer ein nicht gattungsbegrifflich und gesetzmässig, sondern nur individuell zu erfassender Rest bleibt."* [*2:* 224; *cf., 16:* 619]

[82] The statement ascribed to Bowman is essentially correct, though somewhat incomplete [*9:* 288 cf., *10:* 20f.]. There is no indication, in either source, that the statement has any reference to anything written by Hettner.

measure of science" which one hears repeatedly from scientists who have given little study to the question of the meaning of science. We are not told how Bowman applied it to geography.[83]

The assertion that *The Nature of Geography* is based solely on the idiographic side of Hettner's thought has been shown, in previous pages, to represent merely an opinion—and an erroneous one. Such judgments are not damaging. Far more serious is the following accusation, the importance of which is emphasized by the manner in which it is introduced, formulated, guarded, and underscored. "Mainly through Hartshorne's efforts, American geographers have come to look at Hettner as the major recent authority in support of the idiographic conception of their field. Under these circumstances, it is important to point out that the picture Hartshorne paints of the German author is as one-sided as his quotations are selective" (240). Then are presented two passages from Hettner to demonstrate "another side of Hettner's work," followed by the less open statement: "One may agree or disagree with such passages which, as far as we know, have never before been translated into English. But one can hardly deny that . . . they amount to a programmatic declaration in favor of the conception of geography which is here advocated and which has been so vigorously opposed."

In short, Hartshorne is accused of having done injustice to Hettner and of misleading American geographers by selecting quotations from Hettner's work in such a way as to make Hettner appear an advocate for a particular viewpoint which Hartshorne wished to promote whereas Hettner had actually advocated the opposite viewpoint as well.

This is an extremely serious charge against a study which represents a great amount of work by its author and a large investment by the Association. The value of *The Nature of Geography* to the profession rests on its reliability in presenting and analyzing the views of hundreds of geographers, in literally a thousand quotations or references. Among the geographers whose views are considered in it, most attention is paid to Hettner. If the volume can be shown to have presented only half of Hettners' thought on an issue of major importance, students would have reason to doubt its reliability in reporting on any other writers. If the charge is justified, it is of such importance as to require complete and thorough demonstration of its truth; without that, it is mere irresponsible accusation; if it is false, it constitutes libel.

[83] Bowman had in fact discussed this question at length: "Commercial geography cannot be treated throughout like mechanics or light or chemical elements"; its study includes also a "group of facts not capable of rigid scientific treatment," "geography in general . . . has a cultural and also a practical value to living men that far transcends its purely scientific content" [*9:* 289, 291]. The same view concerning geography as a whole is expressed in numerous passages throughout his volume on *Geography in Relation to the Social Sciences* [*10:* 21, 31, 33, 224]. In effect, he expresses essentially the same views concerning the inclusion of both scientific laws and studies of the unique as are found in *The Nature of Geography* and in Hettner's writings, save that Bowman restricts the word "science" to the former, and therefore concludes that geography is only in part "scientific." This difference in semantics among the three writers should cause no difficulty since each of the three indicates clearly his use of the terms involved.

The sole evidence presented to substantiate the charge is the presentation of two, out of many hundred, passages of Hettner's writings that are not used in the volume under attack. Such quotations prove nothing unless it can be shown that they present a picture different from that presented by the quotations or paraphrases that are used. But of these the reader is told not a single word, offered not a single reference.[84]

[84] It is not difficult to find the "selective" passages that are directly pertinent, since the table of contents lists a section on "Generic Concepts and Principles in Geography" and the page-headings there are marked "Generic *vs.* Unique in Science." A few others may be found by use of the Subject Index, under the pertinent headings, "idiographic," "unique," nomothetic." I have also hunted throughout the volume for any stray statements that might offer evidence justifying the accusation. In all, I find two quotations and four or five other pertinent paraphrases or references to Hettner's views on this topic. What do they show?

(1) There are several references to Hettner's writing (citing the four pages of his volume in which he discusses both approaches) which indicate that he did not accept the concept that science is concerned exclusively with the development of laws and principles [*1:* 378], or that generalizations and laws themselves are the purpose of science [*1:* 378–379]; and that he held that a geographic description confined to generic terms is inadequate [*1:* 382 and 431].

(2) Two quotations and a paraphrase which is very close to quotation [*1:* 383–384]:

"It might appear as though geography were as largely limited to the study of the unique as is history, and until the last century, that was no doubt the case. As Hettner notes, 'geography was confined largely to such idiographic description . . . general concepts were to be found only in the crude form expressed by such common typewords as mountain, valley, city, etc.' "

"We can therefore agree with Hettner that 'the greatest advance of geography has been the fact that, by taking over and developing the results of the systematic sciences—earlier in one branch of the field, later in others—geography has gone over to general observations depending on generic concepts.' "

"To some degree, therefore, geography may be called a generalizing or nomothetic science. Both Hettner and Penck find that in this respect geography has a great advantage over history." The page citation for Hettner's statement thus paraphrased points to the passage in his volume which is quoted in the critique as having "never before been translated into English."

The summary of this section, the pertinent section of my volume, also implicates Hettner:

"He [Kraft] agrees with Hettner that this dualism [of the systematic and regional points of view] cannot be expressed simply as the combination of a nomothetic and an idiographic science; systematic geography [by implication, primarily nomothetic] must include the study of unique cases, and regional geography [by implication, primarily idiographic] must use generic concepts and principles" [*1:* 457].

Finally, in the concluding chapter of the volume, summarizing all that has gone before, Hettner's thoughts on this topic are incorporated in statements that repeat again, and in form that seems to me to offer no possibility of misunderstanding, that geography "seeks to establish . . . universal principles of the relationships of phenomena," depends upon these "for the interpretation of its findings" in regional geography, and by comparative study of areas "tests and corrects the universals developed in systematic geography," but must also express and study much of its knowledge in terms of unique cases [*1:* 464, 466, 467].

In sum, there is not a single quotation or reference from Hettner that presents a one-sided picture of his views on this question but at least four quotations or paraphrases which each present both aspects of his view. The accusation, as published in the *Annals,* without evidence and damaging to the value to students of *The Nature of Geography,* is shown by the evidence to be completely false.

Summary. The third section of the article brings to fulfillment the deceptive organization whose effect, if not purpose, is to destroy the reader's confidence in the methodological writings of Hettner and Hartshorne. In the introduction these are pronounced out-of-date; in the first section, paradoxically, they are alleged, without shred of evidence, to be in conflict with views allegedly expressed a century earlier by Humboldt, writing as a geographer, and by Ritter; the second section strikes at what are asserted, without evidence, to be the historical roots of the views of Hettner and Hartshorne, namely, a statement of the philosopher Kant and alleged statements of Humboldt, writing, it is claimed, not as a geographer. On this foundation, the third section imputes views of the writers under attack with a minimum of evidence. In the case of Hettner, the evidence submitted itself refutes the conclusions stated by the critic. *The Nature of Geography* is asserted to contain statements which make its author appear absurd, arrogant, and unreliable, if not intentionally deceiving, but these statements are presented without shadow of evidence.[85]

Section IV of the Critique

The final section of the essay may appear at first reading to have little relation to what has gone before so that some have wondered why this series of brief treatments of separate topics was included in a critique of "Exceptionalism in Geography." More careful reading however shows that contrary to the introductory note, "with exceptionalism disposed of," questions of "exceptionalism" are repeatedly raised. Further, though the students previously identified as "exceptionalists" are almost never named in this section, the attack on their views nonetheless continues.

Pure and applied science (242f). The reader is warned against a syllogism that emphasizes applied science as "the core of science," identifies regional geography as applied systematic geography, and thereby makes regional geography the "core of geography." There is no identification of source of this syllogism; the reader must wonder whether any writer of note ever said that "applied science is the core of science." But the conclusion was previously identified explicitly and repeatedly with the names of Hettner and Hartshorne.[86]

The difficulties geography shares with the other social sciences (243). Though serious difficulties are recognized, to say that the social sciences cannot ever develop to be "as perfect as the natural ones" is denounced as "dogmatic" and *"a priori."* As an assertion about the future such a statement would of course be *a priori,* as is true of all predictions, whether scientific or otherwise. "Upon examination," the critique concludes, such an assertion "usually reveals itself as a romantic plea for

[85] Examination of the evidence in the previous notes, evidence that is readily available, has shown that each accusation is false. In every paragraph, in nearly every sentence of this third section, there is serious falsification, either by commission or by omission, of the views of the writers discussed.

[86] The greater part of the paragraph in the critique, explaining the relation of pure and applied science, is notably similar to the corresponding discussion in *The Nature of Geography* [*1:* 399f.]. The conclusion concerning applied science is the same, but for once I find the form of statement in the critique an improvement: "There is only science and science applied."

such metaphysical ideas as the freedom of the will." This is a blanket charge, without reference to the argument it may be answering. Since this question recurs several times in this final section, and is accompanied by emotionally inspired adjectives, it is pertinent to learn what writings are being attacked.[87]

Geography concerned with structure and morphology (243f.). The discussion emphasizing the peculiarly "morphological" character of geography is very revealing if one examines carefully each of the first seven or eight sentences. Nothing in the immediately preceding discussion prepares the reader for these statements; one must go back to the discussion of "spatial relations" in connection with the views of Humboldt and Ritter (228) to find any connection.

"There is one major aspect in which geography does differ from all the other social sciences"—and evidently also from the other natural sciences—namely, that it is concerned not with the process laws but with morphological laws. In short, the critic finds that geography differs from the systematic sciences. Further, "purely geographical laws contain no reference to time and change"—i.e., geography differs from the historical sciences. Finally, "the geographer, for most part, deals with them [spatial structures] as he finds them, ready made"; compare this with the statement previously denounced, that geography is "a naive science examining reality from a naive point of view, looking at things as they are actually arranged and related."

In other words, when the writer gets away from his set theme of attacking the theoretical concept he has called "exceptionalism" which he first pronounced as "wrongheaded" and "unscientific" merely because of the manner in which Kant may or may not have explained it, and considers for himself what is actually done in geographic study, he comes by a different route to the same conclusions he has previously attacked.

We might at this point logically claim that the critique is a total fraud in pretending to find any issue with the students dubbed as "exceptionalists." It has accepted (via Kraft) Hettner's views of the relations between systematic and regional geography; it has accepted (without mention of source) my statements of the function of systematic geography in developing laws to be applied in regional geography; it recognizes that geography must integrate heterogeneous phenomena,

[87] The entire paragraph is evidently an attempt to refute the discussion in *The Nature of Geography* concerning the difficulty of making reliable predictions in geography [*1:* 432f.]. The difficulties omitted in the treatment of this passage in the previous criticism of Hartshorne's views (see fn. 69), are now presented without identification, as though these were the thoughts of the writer of the critique—the absence of experimentation, the comparison with astronomy, and the difficulty of measurement (quantification). The discussion in *The Nature of Geography* concluded on the basis of these and other difficulties, all empirically determinable, that "we may justifiably predict that a mature geography developed to the maximum cannot attain more than a very restricted capacity for prediction" [*1:* 434]. In addition to the empirically determinable difficulties, the original passage also stated that any predictions in geography "must further be qualified by many uncertain factors due to the more or less arbitrary action of individual men or groups of men"; evidently the author of *The Nature of Geography* is included among those whose arguments reveal "a romantic plea . . . for freedom of the will."

arguing only that much the same is done in other disciplines; and finally it now states, in its own words, the basic differences that distinguish geography from either the systematic or the historical sciences.

To dispose of the essay on this basis, however, would be justified only in terms of its title and organization; it would ignore the one real issue which, to be sure, has not yet been stated but has been implied at numerous points within the discussion of non-existent issues—namely, differences in conception of the fundamental nature of science.

That is the issue that was first hinted at in the statements made concerning the views of Humboldt and Ritter, and emphasized in the dismissal of Kant's views and those of Humboldt's *Kosmos*. It constitutes the real grounds for condemning half of Hettner and all of Hartshorne (though logically we should both be half-condemned). Hettner however wrote little about prediction in geography, one way or the other, whereas *The Nature of Geography* has considerable to say on this aspect of "science" which evidently disturbed the critic—to judge from the extent of distortion of its statements in the critique. The issue emerges again strongly in the discussion of the last topic, in which the difficulties of working in geography solely with scientific laws are lightly dismissed.

The issue is raised again in the latter part of the present topic, when a typical straw-man is set up to be knocked down: given two regions alike in all relevant physical aspects but differing in economic character because the populations of the two regions went through different processes, we are told that this is not a case, "as some would have it," of "a breakdown of 'causality'."[88] Who are the "some" and in what writing has any student made so palpably ridiculous an assertion?

On comparative geography (245). Any reader curious as to what use Humboldt, Ritter, or Hettner made of "comparative geography," or whether they all regarded it in the same way, will here receive no guidance. Though all are mentioned, there are no references.[89]

On typology (245). In this paragraph "exceptionalism" is brought back into the discussion, with the ambiguous sentence: "Exceptionalists will speak of the intuitive grasp of types." Presumably they either do or they don't, but who are they?[90]

[88] The phrase "breakdown of causality" is a correct translation of the title of a study by Lehmann, *Der Zerfall der Kausalität und die Geographie* which is recommended in connection with a discussion of scientific determinism in *The Nature of Geography* [*1:* 309f.]. There is other evidence, as will be noted later (fn. 94), to show that this discussion is part of the source background for the final topic discussed.

[89] "Comparative geography" is a term that may represent several different German terms which have been used, with many different meanings, by a large number of German geographers. The comments in the critique appear to have been derived from a few brief statements in *The Nature of Geography*, which were there indicated as being quite inadequate to do justice to a subject to which contemporary German students have given great attention [*1:* 73, 95, 447].

[90] This discussion is evidently a reaction to a passage in *The Nature of Geography*, which is based not on Hettner but on the psychologist Wörner [*1:* 276f.]. The ambiguous tense "will speak" is used perhaps because my discussion concerns individual areas and in the critique

On the idea of the region (245f.). One short paragraph of the critique claims to have said "all that needs to be said about the notion of a region, from a purely methodological point of view."[91] The reader can hardly fail to recognize this as a high-handed dismissal of studies by innumerable geographers who have wrestled with the problem of the region—in particular an insult to the intelligence of the more than a score of geographers who participated during the past several years in preparing the chapter on "The Regional Concept and the Regional Method" for the recent volume on *American Geography.*

Actually the critique itself includes a quite different statement of the idea of the region, in the passage in the first section taken, without recognition, from Kraft: "those relations obtaining among the individuals and the classes by virtue of which the area considered has that unitary character that makes it a region" (228). Had this statement been repeated in place of the conventional definition used in this section—"an area homogeneous with respect to one or two classes of phenomena"—the conclusion ascribed to Palander would not follow, that "the notion of a region in itself explains therefore nothing."[92]

On holism (246). This presents what appears to be convincing evidence, supported with page citations, that the author of *The Nature of Geography* is inconsistent in having first rejected the doctrine of holism, only to reintroduce it later. The statements given in paraphrase would indicate not merely that the original writing is logically inconsistent, but that it is absurd: "Hartshorne . . . is rightly opposed to the use of that doctrine [holism] in the definition of the geographical area and the region. But . . . he defines cultural regions . . . as 'primary wholes' the parts of which can be understood only in terms of the whole." When statements given only in paraphrase make the original author appear absurd, the intelligent reader will be skeptical of the reliability of the paraphrasing.[93]

On freedom of the will and scientific determinism (246f.). The topic opens

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is transferred to types of areas. But the identity or close identity of particular words like "intuitive," "hunch," "mysticism," etc., indicates that much of the thought in this paragraph of the critique is taken from the writing of the "exceptionalist" and is acceped, thereby classifying the "exceptionalist" among "advocates of the scientific method," but without revealing that fact to the reader.

[91] Presumably the inference is that the critic has "examined" the chapters of *The Nature of Geography* dealing with the problem of the regional concept and tossed them aside [*1:* 250–365].

[92] Palander's criticism of the use made by certain geographers of the regional method depended precisely on the difference represented by the two statements quoted from the critique; homogeneity with respect to one or two classes of phenomena explains nothing; it is necessary to study the causal relations among the phenomena [*11:* 16–19].

[93] The numerous errors in this discussion can readily be checked by any who may be interested, by reference to the original discussions in my text [*1:* not the pages cited in the critique, but 269–281, 351–355]. Certain very specific types of areal units constructed by man are recognized "in particular aspects as forming unit Wholes" [*1:* 278f.]; to conclude from this that I defined "cultural regions" as wholes is at best careless handling of source material producing a falsification. The argument that if a farm can be considered as a primary whole, the same must be true of New York Harbor indicates that the critic has not understood, if he read, the definition of the terms as used in my text.

with a scornful dismissal of any students who reject scientific determinism, asserting that "the many interrelations between the various holisms, uniqueness doctrines, and free will philosophies are a matter of record," but where that record is to be found the reader is not told. While "the debate" over free will is left "to the metaphysicians," the reader is in effect ordered, on the authority of "all modern science," to accept the dogma that "nature is lawful throughout, permitting of no 'exceptions'; that human decisions are determined by their physiological and/or sociological antecedents" and hence "the will is indeed not free." Any who oppose this particular article of faith in science "reject science." In this sense we could understand the earlier claim, had it been presented as an argument, rather than a statement of fact: "Hartshorne does in fact reject all social science."

That Hartshorne and Hettner, at least in part, are held guilty in the present discussion is indicated by its opening clause: "Whoever rejects the scientific method. . . ."[94] The only writer mentioned by name in the discussion is Platt, and only in a footnote. The reader is told nothing of what Platt has to say, nor is any answer attempted. Since scientific determinism is evidently an assumption that cannot be questioned in science, the discussion is limited to an elementary explanation of the difference between that general assumption and the special theory of environmental determinism, leaving doubt as to whether Platt, who wrote an article on each of the topics, distinguishes between them.[95]

In the course of this discussion there are comments on the work of Ratzel, Semple, and Ellsworth Huntington which one may hope will never be matched for triviality and condescension in a geographical publication.

Relation of geography to other disciplines (247–249). The consideration of

[94] Further, as mentioned in previous footnotes (87, 88), it is evident that the critic had noted two brief passages in *The Nature of Geography* that challenge the assumption of scientific determinism. One of these includes reference to the attack on that dogma in the brochure published in 1937 by the Swiss geographer Lehmann [*1:* 310]; from this however the critic appears only to have used the title, "breakdown of causality." But starting from the discussion of the topic in my text, we can follow a trail left by the writer of the critique. The text quotes Hettner, and disagrees with him, that "science as such must be deterministic," and cites pages 411–412 of his essay on *"Geographie des Menschen"* [*3*]. We know that certain paragraphs found on pages 412–413 of that essay are quoted in the critique, though in another connection. We now find that the statements defining scientific determinism in this portion of the critique are strikingly similar to statements found on pages 411–412 of this essay of Hettner's; the similarity is closer than in most cases of acknowledged paraphrasing.

There is, however, one important difference. Hettner indicates a qualification, "in respect to each particular case, to be sure, free will doubtless exists"; but for mankind in general, or in groups, we must think in terms of causal relationships and geography is but little concerned with individual personalities" [*3:* 411–412]. The qualification is evidently unacceptable to the critic; Hettner is not named in support of the dogma for which he evidently supplied the terms in which it is stated.

[95] Platt's two articles are clearly distinct in purpose and conclusion. There is nothing in the paper on "Environmentalim versus Geography" [*3*] that could not have been written by an ardent advocate of scientific determinism. One is forced to the conclusion that the writer of the critique seeing at one "look" that Platt's other article [*12*] questions the validity of a sacred dogma, found it necessary to denounce both papers together.

"the future of geography as a discipline, an *organized unit* within the intricate division of intellectual labor" (underlining added) is somewhat confused in writing. Of three categories of "the laws of geography," the first, including "most of the laws of physical geography," "are not strictly geographical." Strictly geographical are those dealing with "spatial variables," the "morphological laws," in contrast to the laws developed in the systematic sciences, whether physical or social, which explain relationships of particular kinds of factors, other than spatial factors. A third category of the laws of geography "are, of course, not geographical laws, nor do they belong entirely within any of the other now current divisions," but involve variables that "extend over the whole range of systematic social science" and involve also "spatial variables."

This classification, which I have endeavored to interpret as clearly as I can, reflects the limitation on geography expressed in several previous passages in the critique. While it expresses a distinct form of "exceptionalism" for geography[96] its specific meaning is still obscure since its critical terms, "spatial variables" and "morphological laws," are not explained. The single example given as "typical of the second category," strictly geographical laws—namely, the theory of general location—demonstrates the lack of clarity, since it is recognized that this "now flourishing theory" has been developed primarily by economists.[97]

The discussion of the third category seems to contradict the limitation emphasized in the first section of the paper under which the geographer is concerned with "spatial relations and no others" (228). Here it is insisted that "it is our task to make explicit the role these geographical variables play in the social process."

On the other hand, there is no lack of clarity in the final re-emphasis of the dogma of scientific determinism presented by explicit example: if one knows the physical factors and population characteristics of a region and the influences that flow into it from without, and has knowledge of the process laws of social science "one can ideally predict the whole course of history in a region."

Obviously this is not a conclusion that can be demonstrated, or that one could ever expect to demonstrate, since we could never hope to attain all the knowledge necessary to the premise. It is therefore not a scientific proposition but rather an article of faith.[98]

[96] But the brief statements of this view of geography, in several different places in the critique, are not adequate to demonstrate how it differs from that which Hettner had explained, in full discussion, as repeated in *The Nature of Geography* [*1:* 140–142], or indeed how it differs from that stated by either Humboldt or Kant.

[97] The conclusion, if I understand it correctly, is the opposite of that reached in the more detailed discussion of the same topic in *The Nature of Geography* (a discussion not mentioned in the critique) which considers the work of two of the three economists named in the critique, together with that of Palander [*1:* 419–421]. Since Palander's dissertation represents one of the most thorough studies of the theory of location, it is surprising not to find it mentioned at this point, whereas it was previously praised for its keen criticism of the work of geographers in this field, a criticism that constitutes but three pages out of a full volume [*11*].

[98] To this challenge which Platt had effectively presented [*12*], together with his demonstration that the dogma has no utility in geographic work (which is also expressed in *The*

CONCLUSION

The basic purpose of the essay is hidden from the reader—and quite possibly was not recognized by its author. The title and organization of the critique lead the reader to follow the theme of an apparent major issue, "exceptionalism," which proves to be non-existent. Several of the subordinate issues likewise are found to be unreal. The basic theme of the essay, though never stated as such, dominates the writing in every section: geography must be a science, science is the search for laws, and all phenomena of nature and human life are subject to such laws and completely determinable by them. This is a philosophical proposition that is far from new and for which no new arguments or evidence are offered; it is merely reasserted categorically on the basis of authorities either unnamed or fabricated.

To maintain this thesis, it is necessary that any works in geographic methodology which reject scientific determinism must be opposed in every possible way. The main targets are the methodological writings of Hettner and *The Nature of Geography,* which are attacked both directly and in terms of their real or supposed sources.

The critique displays in almost every paragraph the superficial signs of defective scholarship—sweeping assertions without supporting evidence, presenting for attack the views of other writers in obviously loose paraphrasing and commonly without page citations, and the use of "shaded" and derogatory adjectives. While any or all of these do not prove that the conclusions of the essay are unsound, they are more than sufficient to cause the reader to doubt the reliability of any of its statements.

More subtle is the deception of the reader by the confused organization of paragraphs and sections. Paragraphs which appear to present in paraphrase the position of another writer include statements that cannot be found in the original but are inserted, without distinction, so as to bring the reader to the same view as the critic concerning the original writing. The indirect attack on the major target, the views of Hettner and Hartshorne, through attack on the supposed historical origins —a clear example of the method of "historicism," if I understand that term[99]—has the effect of conditioning the reader to believe that these views had been demonstrated to be in error before they are ever stated. Hence, the reader may not observe how little attention is paid to those views and what minute evidence is offered to refute them.

More specifically the re-examination has demonstrated that well-nigh every statement presented as expressing the views of any named authors, or statements made concerning such authors personally, are false, either directly or by implica-

Nature of Geography [*1:* 310]), the writer of the critique offers no answer other than to assert that those who raise such objections reject science.

[99] Some readers of the article under discussion have complained that the subject-index of *The Nature of Geography* gives no references to such terms as "historicism" or "exceptionalism." There is no discussion of those terms in that volume because they had never, to my knowledge, been used in any discussion of the methodology of geography. "Historicism" as a philosophical term is defined in the *Encyclopaedia Britannica,* 1946, Vol. 20: 59a.

tion.[100] Even in quotation of statements through translation where there is no difficulty of translation, alterations have been introduced which give markedly false impressions of the original.[101] The pattern of these falsifications and fabrications is not one of chance, resulting from undirected carelessness; rather they cause writings used in support of the views advocated in the critique to fit those views while writings under attack are distorted to express views the reader can be expected to oppose.

On the other hand, there are numerous instances in which statements written by writers under attack are accepted and used as sound in the critique. But while these are correctly paraphrased, the reader is not informed that they are the views of the writers under attack; rather he is led to suppose that they represent opposing views of the writer of the critique. Had the original sources been indicated, the entire picture of conflict in views would have been revealed as fabrication.

In total, almost every paragraph, indeed the great majority of individual sentences in the critique, represents falsification, whether by commission or omission.[102]

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[100] Careful re-check shows the following sentences are exceptions; so far as I can find they are the only ones that may be accepted at face value: (a) a few sentences concerning Humboldt's scientific versatility (pp. 234f.), facts readily available in numerous reference works; (b) two factual statements concerning my translation of Hettner's word *"Wissenschaft"* (p. 236); and (c) the statement that "Semple was a student of Ratzel" (247).

[101] In all, the critique presents in translation three fairly long passages and two short sentences; free of distortion by mis-translation are: (a) the passage from Rink's edition of Kant (which however is too freely translated to be usable as a reliable source); and (b) the second of the two passages from Hettner.

[102] In addition to the exceptions noted in footnotes 100–101, no such errors were found in the following passages: (a) the general statements concerning the nature of methodology, in the first 12 lines of the article, in the last sentence of the initial paragraph of the first section and the first half of the following paragraph (10 lines), and two sentences in the introduction to the fourth section (3 lines); (b) the comparison of history and regional geography (8 lines on p. 237); (c) the paragraph on maps (24 lines on pp. 244f). Not included in this check are passages discussing history, Karl Marx, or the future of geography. In total, this re-examination has left as possibly reliable material about one tenth of the verbal content of the essay, of which that part which concerns geography contains nothing that appears new.

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THE CEMETERIES OF CHICAGO: A PHASE OF LAND UTILIZATION

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IN the literature of urban land use, cemeteries have tended to be more deplored than studied. It is true that the laws of burial and the design and management of cemeteries have been dealt with, and that cemetery relocation has been given occasional notice.[1] General ideals of cemetery placement have been proposed, and certain models of municipal planning have been reported upon,[2] but the seemingly haphazard manner in which the cemeteries of most American cities have accumulated, while generally acknowledged to be unfortunate, has received slight attention. With this in mind, the author selected the cemeteries of one great city, Chicago, for study.

Geographically, the cemeteries of Chicago presented three aspects that called for investigation. First, the number of cemeteries seemed to be of interest because there were only a fraction as many cemeteries as churches or neighborhoods, suggesting consolidation, while there were many more cemeteries than would be required by strict economy of land use. Second, the distribution of the cemeteries, while easily ascertained, was by no means self-explanatory. The extent of earlier relocation, the relationship of cemetery sites to the land, and other points of needed information were unknown. Third, the amount of land occupied by cemeteries was a matter for curiosity, both in itself and in its relation to the need for burial space.

In the course of the study, all of the cemeteries concerned were visited. Primary reliance for information was placed on cemetery managers and those closely associated with cemetery affairs. The events and conditions which were found to lie behind the present number of cemeteries, their distribution, and their extent are summarized below, following a description of the present status of the cemeteries and a brief history of their accumulation.

[1] For laws of burial, see P. E. Jackson, *The Law of Cadavers* (2d ed., New York: Prentice-Hall, Inc., 1950), and A. L. H. Street, *American Cemetery Law* (Madison, Wisconsin: Park and Cemetery Publishing Co., n.d.).

For three aspects of cemetery design and management, see E. O. Blair, "Some Cemetery Ideals from a Landscape Architect's Point of View," *American Cemetery Association Bulletin*, No. 124 (July, 1946), pp. 8–15; *Management of City-Owned Cemeteries*, Management Information Service Report No. 44 (Chicago: International City Managers' Association, 1947); and F. J. McElligott, "Building a Catholic Cemetery," paper read at National Catholic Cemeteries Conference, St. Louis, November, 1951.

[2] *Cemeteries in the City Plan*, Information Report No. 16 (Chicago: American Society of Planning Officials, 1950); also, *The Cemetery Handbook* (Madison, Wisconsin: Park and Cemetery Publishing Co., n.d.).

THE CEMETERIES TODAY

Seventy cemeteries, excluding those which primarily serve the city's suburbs, at present receive the dead of Chicago. Though less than one-third of this number are located within the present legal limits of the city, nearly all are surrounded by urban land uses and are included within the Chicago Urbanized Area, as defined in the United States Census of 1950 (Fig. 1). In all, they occupy twelve square miles of land.

It would be a mistake to suppose that any of these cemeteries are mere burial grounds, only fulfilling the purpose of disposing of the dead, for it is evident from their adornment alone that they are more than this. Chicago's one simple burial ground is its potter's field, which is publicly owned and additional to the true cemeteries of the city.[3] The social significance of such a burial ground has been indicated in a Philadelphia study in the following words:

> A pressing fear is the vision of a burial in potter's field. So far as social class is concerned, such fields literally represent the end of the line. Here, generally speaking, lie the social ciphers. Individuals interred at potter's field are stripped of all the symbols which classify them as human beings. They are buried without flowers, without clothes, without graves, and without names.[4]

The true cemeteries of Chicago take on significance by contrast, since they are intended to save the dead from just this denial of their humanity. In these, graves marked individually with names are provided; subdivisions comparable to residential districts have been laid out; and the ground is considered to possess a sacred quality which can be dispelled only by the removal or complete disintegration of the contents of the graves.

While responsibility for the act of burial rests generally with the family, land for burial is owned by other social groups. Of the seventy cemeteries, thirty-nine are owned by corporations organized for profit, twenty-six by churches, three by fraternal societies, and two by non-profit cemetery associations.[5] These organizations have broad powers of control over the lot-holders, including the restriction of admission. In cemeteries owned by churches burial is generally restricted by creed and in over two-thirds of all non-Catholic cemeteries burial is restricted by color.

At one time responsibility for the care of cemetery land was shared by the cemetery owners and the lot-holders, and families cared for their respective lots as though they were gardens. The general trend for many years, however (due not only to the scattering of families but to a change in attitude), has been toward the purchase of this service. Cemetery care today is financed either by assessments or from the

[3] This is an eighty-acre tract called Oak Forest Cemetery. It is owned by Cook County rather than the city of Chicago.

[4] W. M. Kephart, "Status After Death," *American Sociological Review*, XV (October, 1950), p. 643. Not more than one-half of one per cent of the dead in 1953 were buried in Chicago's potter's field.

[5] For a qualifying observation on the number of religious and fraternal cemeteries, see remark following tabulation of present cemetery acreage, below.

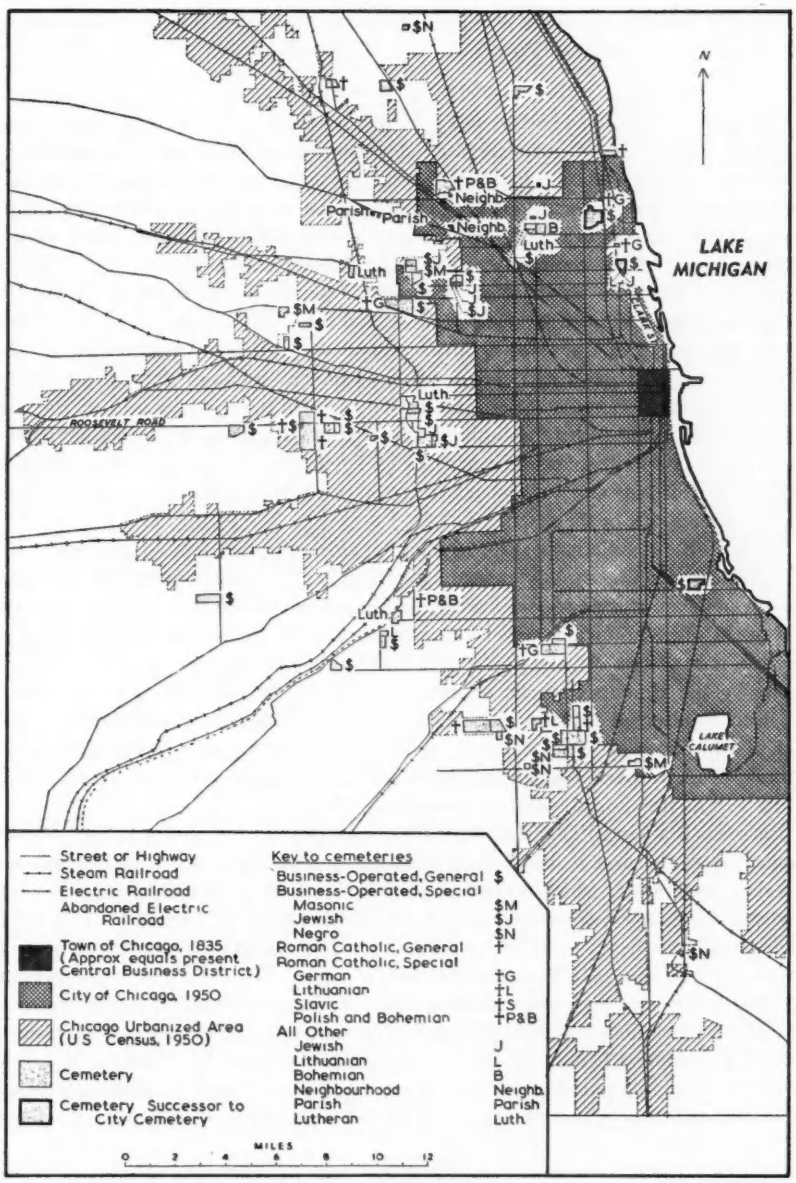

FIG. 1. Chicago and its cemeteries

income of a maintenance fund for the entire cemetery, to which contributions are made from the sale-price of lots.

HISTORICAL SUMMARY

Chicago's first town charter was granted in 1835, when it was realized that municipal control and the coordinated development of civic improvements were imperative. The population had multiplied ten-fold in two years to somewhat over three thousand, and expectations of further growth were stimulated by the projection of a canal to connect Chicago with the headwaters of the Illinois River, opening a gateway to western commerce. Not least among the local practices requiring correction at this time was that of disposing of the dead. Both banks of the Chicago River were used as a burying ground, and the village shared with Fort Dearborn at the mouth of the river a burial plot in the wind-blown sands along Lake Michigan. Some burials had been made near houses, and the victims of a cholera epidemic had been buried at the intersection of what were to be two of the main avenues of the city. With the limits of the new municipal authority set at the edge of a two and one-half square mile area (Fig. 2), further interment within the town itself was forbidden, and two burial tracts were ordered to be laid out, one north and the other south of the town.

By 1850 the population of Chicago had again multiplied tenfold, to thirty thousand, and the city was rapidly extending outward. The city government had established a new cemetery two miles north of the center of the city to which the contents of the older municipal cemeteries were removed. A Jewish burial society had bought a part of this cemetery's acreage and a separate cemetery had been founded nearby by the Roman Catholic church. Nearly all of the early scattered burials had been re-interred in these cemeteries. In 1850, then, accommodation for the dead of Chicago was at its simplest, with a cemetery for the Jewish and Roman Catholic dead, respectively, and a single public-controlled cemetery where private lots as well as free burial space were available (Fig. 2).

Between 1850 and 1900 all three of the cemeteries of 1850 disappeared. The city cemetery was the first to be abolished, giving way to three privately owned, nonsectarian cemeteries, which were invested in by well-known civic leaders of the time and for many years were among the show-places of Chicago. (These are distinguished by heavy outlines in Fig. 1.) The abandoned municipal cemetery became the nucleus of Chicago's first public park. By 1900 ten more privately operated cemeteries had been founded, three new cemeteries had been opened by the Catholic archdiocese of Chicago, and several Jewish cemeteries had been organized. The simple scheme of 1850 was further complicated by German, Bohemian, and Polish Catholic parishes which banded together to found cemeteries independent of the archdiocese and by the establishment of a Bohemian fraternal cemetery and four Lutheran cemeteries.[6]

[6] During this period three remote cemeteries were founded which later came to serve Chicago. One was the churchyard of a rural Catholic parish, and the other two were organized on a non-profit basis by farming neighborhoods.

Several cemeteries were evacuated and removed to more distant sites during this period. A local author, assuming that such a retreat was normal, wrote in 1893 as follows:

> It took very few years before the growing city put its monster arms around the old city graveyard, and it became necessary to dig out the remains of those laid to rest there but a short time before and to transfer them to cemeteries further distant—the dead had to give way to the living. And today circumstances are taking the same turn, for [several] cemeteries are now within the city limits and are surrounded on all sides by dwellings. . . . How long will it be before these cemeteries will have to give way to the living, their necessities and improvements? Nothing will be able to withstand the growth of this still young giant.[7]

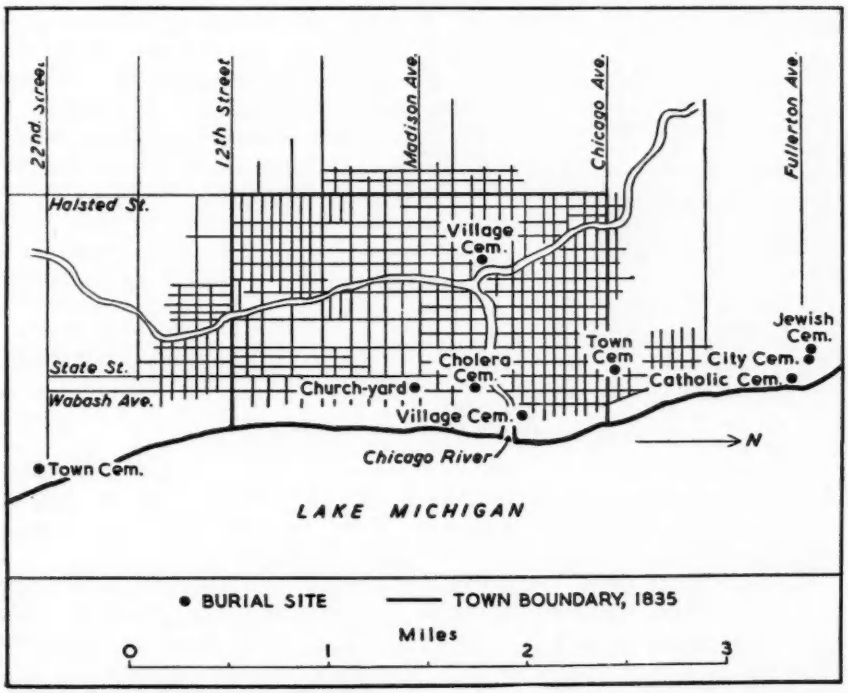

FIG. 2. Early Chicago burial sites. The cemeteries within the town boundaries were replaced by the two town cemeteries, which in turn were replaced by the three cemeteries on the extreme right (north). For town area of 1835 see also Fig. 1. (Shoreline well inland from today's artificial lake front.)

Actually, all of the cemeteries then in existence have withstood the "giant." The last of the cemeteries to adjust to urban expansion, through relocation, was moved in 1890.

[7] Andreas Simon, *Chicago, The Garden City* (Chicago, 1893), p. 123.

Between 1900 and 1950 the number of cemeteries grew from twenty-seven to seventy and all but ten of the additions were business enterprises. Of the remainder, some were founded by the Catholic archdiocese, or by groups of Catholic parishes differentiated on a basis of national origin; Lutheran and Jewish cemeteries were added; and a Lithuanian fraternal cemetery was organized. There have been no cemeteries organized since 1950 to serve primarily the population of Chicago. The contrasting conditions of 1850, 1900, and 1950 are presented in Table I.

TABLE I

Year	Population[1]	Accumulated number of deaths[2]	Number of cemeteries	Cemetery acreage[3]
1850	29,963	8,000	3	100
1900	1,698,575	535,700	27	2600
1950	3,620,932	2,325,000	70	7500

[1] From U. S. Census returns.

[2] Totalled from mortality reports and rounded to the nearest hundred. These are taken to equal the number of burials, assuming the difference between imported and exported dead to be negligible.

[3] Correct to the nearest hundred acres.

THE NUMBER OF CHICAGO'S CEMETERIES

Concerning the first of the three main subjects of inquiry, the present number of cemeteries, the historical record makes it clear that there has been no conscious over-all coordination of cemetery growth. There has nonetheless been a certain logic in the increase, indicated in the six reasons listed below:

Need for burial space. Since 1835, the total amount of available burial space has been more than sufficient to the needs of Chicago as a whole, but burial space attractive to particular parts of the population has from time to time approached exhaustion, and additional cemeteries have been organized on this account.[8] Thus each of three cemeteries founded by the Catholic archdiocese after 1900 served to relieve an archdiocese cemetery already in existence. Other examples might be cited, each of them a neighboring near-duplicate of a cemetery approaching the saturation point.

Demand for Accessibility. At least fifteen of Chicago's cemeteries have been founded to afford burial space closer to interested families than that already available. An increase from one cemetery to three of the same type for improved accessibility has been frequent, which suggests a division of Chicago and vicinity into three sectors. Northern, western, and southern sectors do exist in practice, so that a cemetery located in one of the sectors is practically out of competition with cemeteries of the same type in the other two sectors. This division became

[8] Complete exhaustion of burial space has yet to occur in any cemetery. Sales, as distinct from burials, have gone through to completion in no more than four cemeteries.

evident during the 19th century, and it continues in effect today despite the ease of automobile transportation.[9]

Demand for Religious Distinction. Over one-third of Chicago's cemeteries have been called into existence by a desire for segregation of the dead on religious grounds, although there have been other immediate reasons for the founding of many of these. Interestingly, only the Roman Catholic church, Lutheran churches, Jewish congregations, and one Greek Orthodox congregation have been moved by a conviction of religious difference to establish their own cemeteries. Other denominations have taken no responsibility for burial places, or have purchased small plots in large cemeteries operated by private corporations.[10]

Demand for National Distinction. Cemeteries have, especially in earlier decades, served to make a symbolic show of independence and pride on the part of foreign sub-communities within Chicago and this has led to a further multiplication of cemeteries. Bohemian, Lithuanian, Polish, German, and Swedish groups have been active in the founding of separate cemeteries, while Chinese, Japanese, Greek, Syrian, and other groups of relatively small population have had recourse to sub-sections of large business-managed cemeteries.

Denial of Burial Space. Death is not to be denied, and places for the dead may not be restricted without new ones being found. Exclusionist policies on the part of established cemeteries have at times combined with the separatist desires of some groups to produce new cemeteries, but exclusionism alone has been responsible for the existence of one set of cemeteries. The Negroes of Chicago, generally (though not completely) denied burial space, have turned to five cemeteries of their own.

Changing Fashions. Changing decorative taste has affected all of Chicago's cemeteries in varying degree, but it has furnished a motive for cemetery creation only among cemeteries operated for profit. Among religious, fraternal, and other non-commercial institutions changing landscape styles have not been sufficient cause for so serious an undertaking.

So far as profit-making cemeteries are concerned, all of the reasons cited above have been operative in their multiplication. The first great opportunity for profit was created when burial was stopped in the city cemetery. Since that time opportunities have continued to arise in an expanding general market, from which Roman Catholic families have been consistently diverted and Lutheran families largely so. A desire on the part of members of the Masonic Order for something like religious distinction was met in the 1920's by three new cemeteries for the Masonic dead. An apparent weakening of Jewish allegiance to the religious and fraternal organizations which had been providing for burials opened the way for business-operated Jewish cemeteries in the 1930's.

[9] The partition of Chicago into North, West, and South Sides is generally accepted among Chicagoans. A possible fourth sector is occluded by Lake Michigan.

[10] An exception is one Unitarian church which maintains a crypt for the cremated remains of its deceased members. Many Catholic churches and a few other churches have small burial crypts within them, but interments are few and highly restricted.

LOCATION AND MUNICIPAL CONTROL

The problem of cemetery location may best be appreciated by considering it against the separate backgrounds of municipal control, transportation, and land, which is the order adopted in the following discussion. As a rule, cemeteries have been located where they were acceptable to the governments of Chicago and surrounding towns and villages, or where municipal control has not reached. The government of Chicago has been generally inclined to exclude cemeteries ever since its initial prohibition of 1835. Following periodic extensions of the city, further ordinances were passed to such effect that by 1888 Chicago was entirely clear of cemeteries, but in the ensuing years cemeteries appeared again within the city, principally through the annexation of territory, but occasionally through the granting of special permits. One motive for opposition to cemeteries, strongest in the early decades of the city's history, was expressed in an ordinance which declared that cemeteries "cannot fail to be prejudicial to the health of the vicinity as well as to the general health of the City of Chicago."[11] The other motive for governmental opposition has arisen from the fact that land dedicated to burial use is not subject to property tax. Only a renewed extension of the city limits can bring a further increase in cemetery acreage, since the passage of an ordinance in 1931 made it unlawful "for any person to establish, enlarge, or alter the boundaries of any cemetery within the city, or within one mile thereof."[12]

Chicago has been nearly surrounded by lesser communities for at least the past sixty-five years, and these towns and villages are also empowered under Illinois law to prohibit the establishment of cemeteries inside their corporate limits or within one mile thereof. Records are lacking as to the number of prospective locations which have been abandoned due to a denial of permission, but it is known that one cemetery south of the city was successfully established only because its founding preceded by a few hours the incorporation of a neighboring village. The legality of a less fortunate cemetery north of the city is being contested at the time of writing.[13]

Another government with power over cemeteries is that of the county in which Chicago is located. The Cook County Board of Commissioners has proven increasingly reluctant to grant approval of new cemeteries since 1930. Although there is a conviction among some cemetery managers that no further permissions will be granted, a more likely prospect is that they will be limited to cases where a definite need can be shown to exist.

[11] "Proceedings of the Common Council of the City of Chicago for the Year 1866" (1867), p. 27.

[12] *Municipal Code of Chicago* (1939), Chap. 93, sec. 14.

[13] Cemeteries have on a few occasions furnished points of origin for communities. Monument dealers and saloons, which have in the past regularly associated themselves with cemeteries, have in three places formed the nuclei of villages (all eventually annexed to Chicago). With the rise of automobile transportation the business advantages of location near a cemetery entrance have largely been lost, and today a cemetery makes little contribution to the economic life of its immediate vicinity.

LOCATION AND TRANSPORTATION

Cemetery founders have, for reasons of their own, generally sought remoteness from the center of the city (hence over eighty per cent of the cemeteries have been converted from farm land). At the same time they have shown a decided preference for locations on or near main lines of transportation, to compensate for the inconvenience of distance; but since urban growth has generally proceeded most rapidly along these very lines, the original remoteness of the cemeteries has usually been short-lived.

Of the twenty cemeteries now to be found within Chicago (Fig. 1), those established before the coming of the railroads were attached to main highways, and those after, to railroad lines, with minor exceptions. None of these was founded in the automobile era. Rather surprisingly, street car service played little part in the localization of these cemeteries, though street cars and buses have been of great importance in their eventual operation.

Of the fifty Chicago cemeteries beyond the present city limits (Fig. 1), those founded between 1855 and 1920 showed a definite preference for locations alongside railroads. Of the exceptions, two were intended originally to serve adjacent suburbs, and one was founded at the far end of a radial avenue along which most of the Polish population which it served was concentrated. This general railroad alignment left open great wedges of countryside and in these, rather than in areas more distant from the central city, nearly all of the cemeteries founded since 1920 have been located. Within the wedges they have been placed near well-travelled highways. The automobile has not only brought cemeteries back to a highway-orientation, but it has nearly eliminated rail service to older track-side cemeteries.

LOCATION AND LAND

While contending with municipal regulations and transportation problems, the founders of Chicago's cemeteries have explored for desirable land, with an eye to good drainage, ease of excavation, and capacity for supporting plant life. The land they have been obliged to choose from (Fig. 3), owes its characteristics mainly to Pleistocene glacial and post-glacial phenomena.[14]

When the last continental glacier to cover the present site of Chicago withdrew, generally to the northeast, there was deposited along its outer edge a border of glacial debris locally known as the Valparaiso Moraine, which appears today as a belt of gently rolling land to the west and south of the city. Between the retreating glacier and this barrier, water from the melting ice formed a lake, Lake Chicago, which at one time spread almost entirely across the present site of Chicago and discharged through a depression in the moraine, to the southwest. Subsequently, the land was smoothed by wave action and undertow as the lake receded to the present level of Lake Michigan. The resultant low-lying plain is not unrelieved in its flatness, for

[14] The following brief summary is based upon J. Harlan Bretz, *Geology of the Chicago Region*, Part I, Illinois Geological Survey Bulletin No. 65 (Urbana: Illinois Geological Survey, 1939).

Lake Chicago stood for long periods at three successive levels, all higher than that of present Lake Michigan, and at each level it formed shore deposits, fragments of which survive in the landscape of today. These deposits are made up of beaches, spits, and bars which rise from a few feet to as many as thirty feet above the surrounding plain.

The attractiveness of these sandy ridges to cemetery organizers is made evident by the map in Figure 3. They are well drained and easily excavated, though the addition of topsoil has often been required for the support of a good cover of vegetation. Twenty-six of the cemeteries are situated on the ridges, some of them along the edges of former islands in Lake Chicago, and nine more are located upon these morainic outliers themselves.

The Des Plaines River, west of Chicago, has become a principal cemetery axis. Here, advantage has been taken of the easy connection for systems of underdrainage and of natural stands of trees. Beyond the Des Plaines River, on the Valparaiso Moraine, where thirteen cemeteries have been established, the generally rolling surface facilitates landscaping and improves drainage.

None of the Chicago cemeteries has been established on land without some shortcomings. Nearly all of the cemeteries have some portion that is low and poorly drained, and expensive systems of underdrainage are common, probably reaching the extreme in a cemetery on the former lake bottom, where over $200,000 has been spent on drainage. Difficult digging in at least some part of a cemetery is widespread, the extreme case being a cemetery on Mt. Forest Island where many graves have been blasted out of limestone. Topsoil has been added and slopes created in many instances. Nonetheless most of Chicago's cemeteries have been located with a view to minimizing difficulties inherent in the land.

THE EXTENT OF THE CEMETERIES

The third and last problem is that of cemetery area. The discussion below begins with the facts of area, proceeds through a consideration of land-use within the cemeteries, and ends with observations on ways of reducing the need for burial space. The total area covered by cemeteries in 1950, as shown in Table I, was 7,500 acres. Since then the total has risen, through expansion, to 7,700 acres, of which 1,350 acres lie within the limits of the city, making up almost exactly one per cent of Chicago's area. The distribution of acreage among the cemeteries is shown in the following tabulation:

Acres	*Number of Cemeteries*	*Acres*	*Number of Cemeteries*
0–49	17	200–249	4
50–99	21	250–299	1
100–149	15	300–349	1
150–199	8	350–399	3

In each of three places many minute cemeteries owned by Jewish congregations and benevolent societies are to be found grouped in a continuous block, and they have

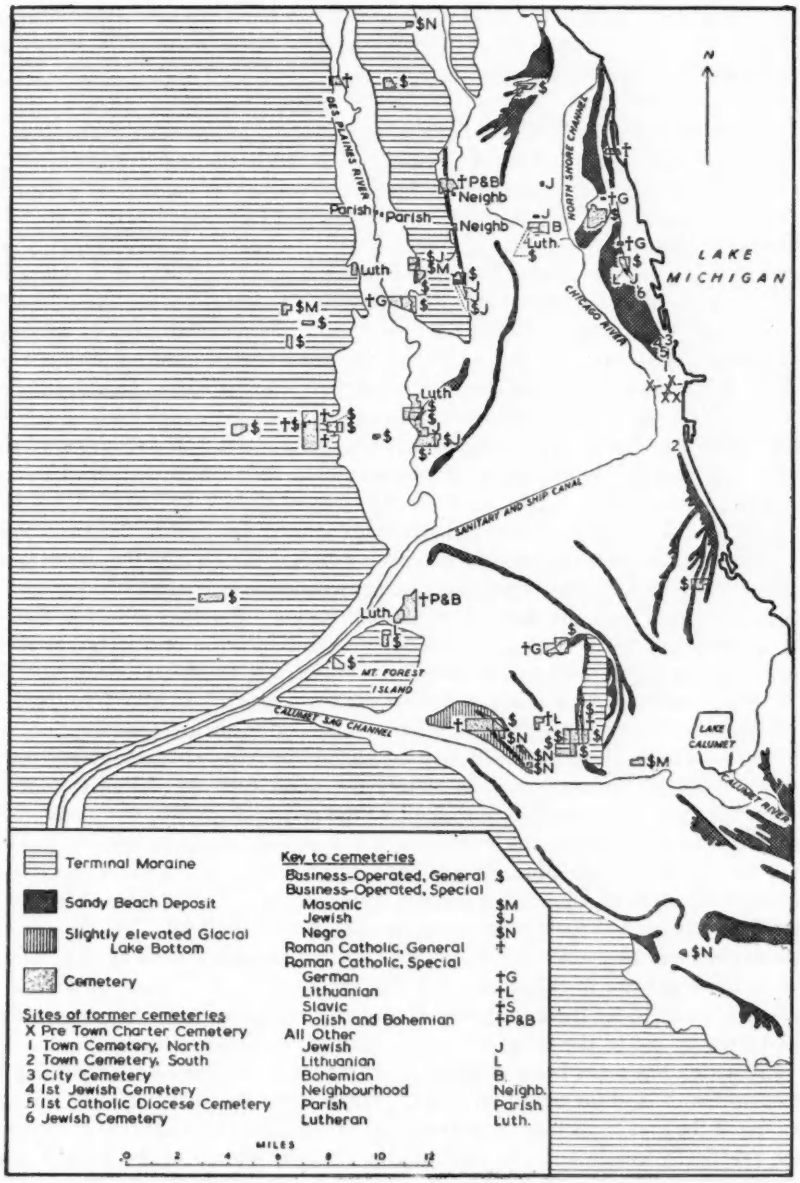

FIG. 3. Cemeteries and major natural features of Chicago and vicinity

been counted as a single unit. The cemeteries of 150 acres or more are all Catholic or business-operated. The nine cemeteries of 200 acres or more account for one-third of the total cemetery acreage, and could accommodate all of the Chicago burials to date.

Today no more than 2,000 acres of land are occupied by the dead. The discrepancy between this figure and the total cited for cemeteries is largely due to the fact that neither the founding of cemeteries (as pointed out above) nor their expansion has usually been directly responsive to the simple need for burial space. Expansion generally has arisen from the desire to anticipate other real estate buyers, to guarantee a long-continued life to a cemetery, or to maintain that flexibility of development which a reserve of undeveloped land makes possible. Land kept in reserve is brought into use in much the same fashion as residential real estate: an area is surveyed, roadways and paths are laid out, underdrainge is provided, a watering system is installed, the land is cut and filled for proper contour, topsoil is added where necessary, turf, trees, and shrubbery are planted, and property boundaries are marked. About twenty to twenty-five per cent of land so developed is given over to non-burial uses —routes, service buildings, and decorative features. By such means burial space is given sale value.

Some of the unoccupied land is made up of graves destined to be permanently vacant, a condition attributable to three main causes. The first is the use of grave land for purposes of display, a practice especially widespread in the 19th century. A second cause has been the mobility of the population. Families who contract for local burial space move away from the city and since a sense of attachment to the city is lost their dead are not returned for burial. A third cause has been the "pre-need" sales policy of a few of the cemeteries wherein lots have been sold for present profit without proper regard for the likelihood of their future use.

Occupied burial land is relentlessly increasing, in units of about thirty square feet per burial at the rate of about twenty-five acres per year. Relief from this pressure is offered by three obvious devices: the re-use of graves, the placement of coffins one above another, and cremation. The re-use of graves after a specified time, successful in some cities outside the United States, is unknown in Chicago, and no relaxation of a prejudice against it is evident. The placement of coffins one above another is known to be common only at one cemetery. Nearly all cemeteries, it is true, have scattered family mausoleums in which vertical placement of coffins above ground is customary, but any saving in land is doubtful because of the space occupied by these buildings. Similarly, the immense public mausoleums maintained by six of the cemeteries effect little or no space-economy.

Cremation has often been heralded hopefully by those interested in curbing the consumption of land for burial purposes. While it has increased steadily since the opening of the first crematory sixty years ago, two important population groups have been practically unaffected. By custom, the Catholic church in the United States is against cremation, hence the Catholic dead (one-third of all the Chicago dead) are seldom cremated. Of the Negro dead (one-eighth of the Chicago total), it is

estimated that less than one per cent are cremated. Of the remainder, an estimated fifteen per cent are cremated, comprising about eight per cent of all the Chicago dead. All ten of Chicago's crematories are owned by business-operated cemeteries, the very institutions to whose interests cremation might be presumed to be inimical. Ash-remains are customarily placed in urns, which are either kept in niches in buildings provided for the purpose or are buried. A few cemeteries have platted small squares for the deposit of urns, but for the most part accommodation is improvised in family lots, using space at the base of a family monument or in part of a standard grave. Though the consumption of grave space has thus been somewhat abated, the effect of cremation has yet to be felt as a restraint on cemetery expansion.

CONCLUSION

The history of Chicago's cemeteries has been marked by the rise of business institutions, and by a specialization of cemeteries based on religious, national, and other grounds. Present-day cemetery locations are in large part anachronistic, since most cemeteries were founded prior to the dominance of automobile transportation, and none have been relocated since 1890. The locations are expressive of a search for favorable land, joined with an attraction to those lines of transportation which were important at the time of founding. Great areas have been removed from consideration by municipal controls. All of the cemeteries taken together represent an engrossment of land far in excess of that occupied by the dead, but this space has been acquired on the assumption of a continuing demand for graves. To date, ways of economizing on the consumption of land for burial, now proceeding at the rate of about twenty-five acres per year, have been of small effect.

THE REGRESSIVE EFFECTS OF LATE 18TH CENTURY BRITISH COLONIAL POLICY ON LAND DEVELOPMENT ALONG THE UPPER ST. LAWRENCE RIVER

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DURING the early decades of the 19th century, sharp contrasts existed in the land development of the Canadian and American sides of the upper St. Lawrence River.[1] Covered with extensive bush, with straggling villages and roads impossible to manage, the Canadian landscape still exhibited a backward frontier quality which was fast disappearing from the American scene. That such a divergence should have occurred was striking, considering that settlement had taken place along the Canadian bank of the river at least a decade earlier than along the American. Not only that, but the Canadian settlements fronted the main and only gateway to British North America, whereas for the American communities the river was no more than a frequently inconvenient back door.

A number of early 19th century travelers who passed through the St. Lawrence lowland were impressed with the evidence that indicated slower material progress on the Canadian side, recording in their notebooks numerous examples which caught their attention.[2] Contemporary impressions and observations are confirmed by the census materials for 1835,[3] the first year for which some comparable statistical data are available.

Canadian settlement and development, above all, showed a spatially uneven rate of growth. Although the population density averaged about 22 persons per square mile, it fell as low as one per square mile or less in some interior areas. In general, the average density was about 14 persons less per square mile than on the American side. It is unlikely, too, that improved land on the Canadian side reached 15 per cent of the total area, whereas across the St. Lawrence at least 20 per cent of the land had been improved. On the two sides of the river, agriculture in all its basic aspects was similiar; yet, the Canadian economy still retained many of the characteristics of subsistence while the raising of livestock for sale reached con-

[1] This study is concerned with the territory included within the five counties of eastern Ontario which extend along the St. Lawrence, from the provincial boundary of Quebec in the northeast to Lake Ontario in the southwest. For comparative purposes, reference is also made to the adjacent lowland section of St. Lawrence and Jefferson counties in New York State (Fig. 1).

[2] See: Patrick Sherriff, *A Tour through North America; together with a Comprehensive View of the Canadas and the United States* (Edinburgh, 1835), p. 129; Thomas Magrath, *Authentic Letters from Upper Canada* (Dublin, 1833), p. 102; Joseph Pickering, *Inquiries of an Emigrant* (London, 1832), p. 169.

[3] *Census of the State of New York for 1835* (Albany, 1836); *Census of Canada, 1870–1871*, Vol. IV (Ottawa, 1873).

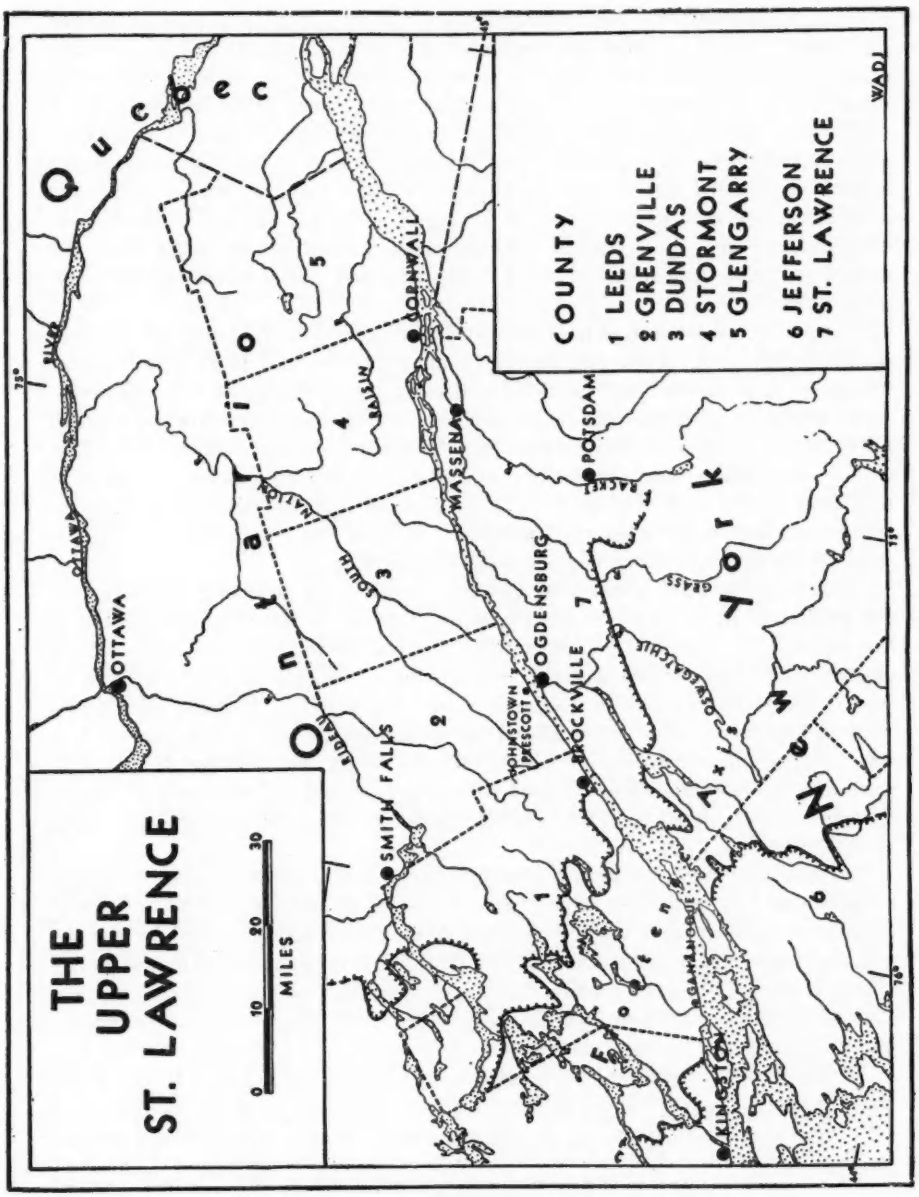

FIG. 1. The Upper St. Lawrence

siderable proportions on the American side. Granted that the Canadian farmer had access to fewer markets than the American, he also endured the disadvantage of distinctly poorer roads. The major communities of northern New York—reminiscent of New England, with their broad, tree-lined boulevards, village squares, and white frame houses[4]—were all linked by tolerably good roads. The contrast with the unimpressive clusters of grey limestone, brick or log dwellings, which clung to the rutted dirt tracks that passed for roads on the Canadian side, was substantial. In human terms, the differences could be summarized in the fashion of a contemporary: the Canadian villagers lacked an enterprising spirit, while the Americans "have that restless activity which they call shove, which makes everybody active."[5]

Physically, the lowland of the upper St. Lawrence is relatively uniform throughout. Climate, soils, vegetation, and topography pay no heed to the international boundary. During the initial period of settlement, the conditions of life were everywhere the same, with their handicaps, hardships, and effort. Nevertheless, marked differences evolved. These were primarily the result of measures taken at the conclusion of the American Revolutionary War by the British government and the legislature of the state of New York to promote the rapid settlement of their respective territories along the St. Lawrence. Because the differences were significant, they warrant geographic analysis and explanation.

So greatly in need of revenue was New York State following the war that the legislators in Albany envisaged a quick disposal of the northern wilderness through sale. In fact, in 1791, practically all of the territory between the northern slopes of the Adirondacks and the St. Lawrence was sold at public auction to Alexander Macomb. Unable to develop his vast holdings, Macomb soon relinquished his title to others who, after 1800, undertook the job of bringing settlers into the area. By constructing roads through the woods and by materially assisting the immigrants in other ways, the proprietors soon found their investment profitable. When the international boundary was clearly defined after the War of 1812, rapid growth ensued.

On the other hand, the British government planned to establish effective control of its territory by conferring large grants of Crown (government) land on faithful followers: in effect, on Tories or United Empire Loyalists displaced by the reorganization of the Atlantic seaboard. A more important feature of British policy appeared after 1791 when Crown and clergy reserves were created, embracing a third of the then-known province of Upper Canada, now the southern or peninsular part of Ontario.

The alienation of extensive tracts of land to loyalists was designed to encourage the formation of a native and trustworthy aristocracy. The reserves had the same

[4] Robert Gourlay, *Statistical Account of Upper Canada, Compiled with a View to a Grand System of Emigration*, Vol. II (London, 1822), p. 111.

[5] M. A. Garland (ed.), "From Upper Canada to New York in 1835; Extracts from the Diary of the Rev. William Proudfoot," *Mississippi Valley Historical Review*, XVIII (1931), p. 378.

implicit purpose. The latter, particularly those set aside for the use of the Crown, were intended to overcome one of the major weaknesses that had existed in the political control of the 13 colonies.[6] By providing an independent source of revenue for the executive branch of the colonial administration at York (Toronto), the reserves would free the authorities from the type of popular interference and obstruction which had plagued the king's representatives in the former colonies. Similarly, the clergy reserves were to afford an endowment for the Protestant church. It was anticipated that the church, duly established, would exert an influence toward social stability as in old England.[7] In short, the settlers along the Canadian side of the St. Lawrence were to be molded into an orderly breed of men. Democracy and egalitarianism, so markedly a feature of life on the American frontier, would not disturb the body politic of Upper Canada, at least if the British government could prevent it! British settlement policy was intended to create a somewhat static society; to a very great degree, it also retarded land development. In no section was this more clearly evident than along the Canadian side of the upper St. Lawrence River.

The St. Lawrence lowland was one of the earliest settled areas of Upper Canada. Between 1784 and 1800, two tiers of townships were laid out along the river. The townships, each approximately nine miles wide by twelve miles deep, were divided into consessions, a mile and a quarter apart and paralleling "the broken front" along the river. Each concession was subdivided into narrow, rectangular lots of about 200 acres each. Allowances for roads were made along the concession lines—a factor which, to a considerable extent, is still reflected in the present-day road pattern of southern Ontario.

Originally, elaborately-drafted township plans were to be imposed on the wilderness. For example, a town—one mile square, containing 640 lots—was to be centrally located in each township. Certain lots were to be allocated for public squares (parades), public buildings, market places, a church, a school, and a hospital. A half-mile tract surrounding the town was designed for the defense of the community. Town "parks," each 24 acres in area, were to adjoin the military reserve, providing suburban estates for the aristocrats of the town. Finally, 2,000 acres in each corner of the township—a total of 8,000 acres—were to be withdrawn from alienation and set aside as Crown reserves.[8]

Before the plans could be applied to the field, several thousand acres of land had been taken up by settlers or were in the process of alienation. Modifications

[6] Adam Shortt and Arthur G. Doughty (eds.), *Documents Relating to the Constitutional History of Canada, 1759–1791*, Vol. 1, Sessional Paper No. 18, Canadian Archives (Ottawa, 1907), p. 646.

[7] It was not specifically stated which Protestant body would benefit but both British officialdom and the Church of England assumed, quite naturally, that the latter institution was implied. In succeeding decades, a conflict arose among several Protestant groups over the endowment, creating a very sordid chapter in the religious history of Ontario.

[8] *Third Report of the Bureau of Archives for the Province of Ontario*, 1905, Ontario Bureau of Archives (Toronto, 1906), p. lxii.

were necessary. Hence, only two township plans, containing the town sites of Cornwall and Johnstown, materialized, and these plans were altered considerably. Careful attention had been given to selecting the town sites. Cornwall, at the foot of the rapids in the upper St. Lawrence, was scheduled to serve as a trans-shipping point for Montreal cargoes destined for western parts of the province (Fig. 2). The other town, situated above the rapids, marked the lowest point on the river to which vessels from Lake Ontario could venture.

While projecting an orderly development, the British simultaneously took measures to promote settlement. Free grants of land were offered to Tories or loyalists, and to other refugees of the Revolutionary War. Military personnel brought from Europe or recruited on the seaboard were also eligible for land, the distribution of which was arranged according to the rank of applicants.[9] After 1791, inducements were held out to dissatisfied inhabitants of the republic. As a result, a considerable number of emigrants from New England and New York took advantage of the opportunity to obtain free land and entered Upper Canada. Indeed, so significant became the post-Revolution migration that by 1812 at least four-fifths of the population of Upper Canada were of American origin, only one-quarter of whom could rightfully claim to be of loyalist stock.[10]

Accompanying the establishment of a provincial administration and the division of the colony into counties in 1791, there was begun the reservation of two-sevenths of the land in every township for the Crown and clergy. The original township plans, only partly instituted, were now virtually abandoned.[11] A reorganization, based on what became known officially as the "Chequered Plan," was introduced. Every other lot in the township, if not already patented or alienated, was henceforth to be set aside as a reserve. Wherever lots had been granted in an extensively contiguous fashion so that they prevented the complete adoption of the chequered plan, blocks of lots, including whole concessions, were reserved at the "rear" of the township or in other townships where space still remained (Fig. 2). In the five St. Lawrence counties, the Crown and clergy reserves amounted to about 490,000 acres, or approximately a third of the total area.

Since the reserves were not to be alienated through grant or sale,[12] revenue was to be obtained by means of short leases to worthy applicants. Preference was to

[9] The initial award to loyalists ranged from 50 to 100 acres, but additional grants were made for children, as dowries for daughters, or as rewards for clearing the land already assigned. Military personnel acquired from 300 to 5,000 acres and more, depending on rank. Fraud and favoritism resulted in many persons obtaining very extensive holdings. *Ibid.*, pp. lxii–lxxii.

[10] Michael Smith, *A Geographical View of the Province of Upper Canada, and Promiscuous Remarks upon the Government* (Hartford, 1813), pp. 62–63.

[11] All that remained of the plans were the town plots. Cornwall grew slowly throughout the 19th century, but Johnstown declined shortly after the War of 1812, being replaced as a river port by Prescott, a fortified community with better anchorage three miles upstream.

[12] This regulation applied primarily to the clergy reserves. Crown reserves were granted to settlers from time to time, the most notable instance in the St. Lawrence counties being the settlement of veterans on Crown reserves in the vicinity of the Rideau River after the Napoleonic Wars.

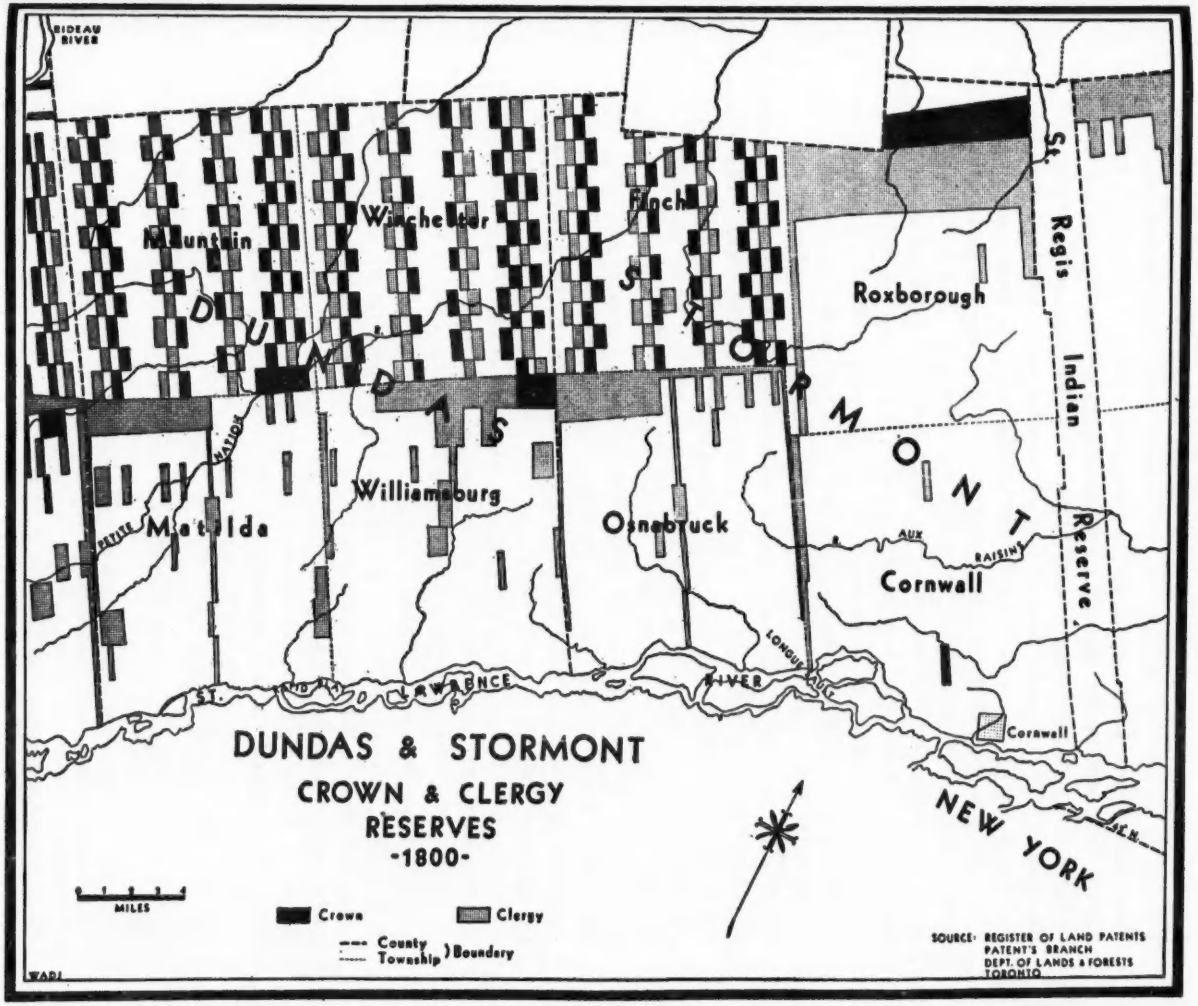

FIG. 2. The distribution of Crown and Clergy reserves in Dundas and Stormont counties, illustrating the pattern prevalent throughout the five Canadian counties along the upper St. Lawrence River.

be given to settlers who occupied adjacent lots and who, by their industry, indicated a capability of working additional land. In this manner, the reserves would be cleared and improved, would increase in value, and would not in any way become an obstacle to uniform development. For the pioneer, however, the whole arrangement merely emphasized the galling fact that he would benefit only indirectly from the reserves while others immediately gained from his energy and hard work.

The weaknesses inherent in the British land system were soon apparent to all who wanted to see. By about 1805, nearly three-quarters of the land in the five counties, approximately 850,000 acres, had been alienated. Yet it is doubtful if there were more than 7,000 settlers in the whole area. Practically all of the population was distributed within eight miles of the St. Lawrence. With the exception of northern Glengary and Stormont counties[13] where, in 1802, immigrants from Scotland had obtained 160,000 acres, the interior townships had few inhabitants.[14]

Since there was no real pressure or desire for movement northward into the interior, many of the loyalist holdings were abandoned or became staple articles of commerce. Nearer the St. Lawrence unimproved lots generally sold for a dollar or more per acre, but many of the land owners virtually gave their distant lots away. The recipients of loyalist "rights" were predominantly local businessmen or prominent politicians in York. They made little immediate attempt to dispose of their lots since the taxes on unimproved lots were negligible and, with time, the value of the land was bound to increase. Consequently, the land in interior townships came to be divided between absentee landlords and the beneficiaries of the reserves—the Crown (government) and the clergy.

There was nothing inherently wrong with the policy of providing free or cheap land to settlers, but enforcible settlement duties should have accompanied a patent. As it was, the existing duties achieved little save the constant irritation of the settlers. Even though taxes were imposed on unimproved land, they were nominal—and gracefully avoided. Had the colonial administration, the notorious clique known as the Family Compact, not been so incompetent and corrupt, it might have promoted development through exerting pressure on the collection of the patent and survey fees which accompanied a grant. However, it became almost impossible to collect the fees, especially after the War of 1812 when they were inflated from an initial $15 to a record high of $100 on a 200-acre lot.[15] Since the fees provided, or failed to provide, for the salaries of the authorities, the latter

[13] Notably in Finch Township, Stormont County, and Lochiel and Kenyon townships, Glengary County.

[14] There were probably no more than 400 inhabitants in the interior townships of Leeds and Greenville counties, with about 180 in the latter county.

[15] George C. Patterson, *Land Settlement in Upper Canada, 1783–1840*, Sixteenth Report, Public Archives of Ontario, 1920 (Toronto, 1921), p. 176.

were forced to turn to land speculation which, from their indulgent point of view, was both necessary and legitimate.

Without doubt, the early 19th century Canadian settler was much better off, in some respects, if he could afford to buy land outright rather than wait tediously for a grant. As one contemporary pointed out: "It is much to be regretted, that where land is said to be gratuitously bestowed, any fees should be deemed necessary; as the boon when accompanied by this demand is calculated to produce discontent rather than gratitude, especially where the emigrant finds that his fees amount to one-half the sum at which he could select and buy the same quantity of land, without the delay attending the grant, and unshackled with any conditions or clearing dues."[16] However, should the settler seek to purchase land from the administration, he would likely be compelled to accept land well into the bush or else some unsatisfactory lot near the river. Rejecting a government purchase, his alternatives would be to obtain more costly, but perhaps more accessible, land from a monopolist, or finally to migrate to the United States, which he frequently did.

Since pioneer settlers did not look favorably on the leasehold, no more than 175 clergy reserves, about 35,000 acres, and perhaps fewer Crown reserves, had ever been under lease during the first three decades of the 19th century.[17] The fact was simply that immigrants, particularly if they had fled from tenancy in Britain, wanted to own land. Moreover, there had never developed sufficient pressure to force the acceptance of the reserved-land leasehold principle, even though the population had grown by 1835 to approximately 58,000. Consequently, the revenue that came from the reserves was always insignificant. Neither the administration nor the clergy ever found in the reserves the great source of wealth that had been anticipated in 1791. Furthermore, from a geographical point of view, the reserves, along with the extensive tracts of land held by absentee owners, paralyzed local improvement. In many townships, even where the land was fertile and desirable, settlement was isolated and spotty;[18] the blazing of concession roads was made virtually impossible (Fig. 3). A Select Committee, reporting to the British House of Commons in 1828, stressed that "these reserved lands as they

[16] Adam Hodgson, *Letters from North America, Written During a Tour in the United States and Canada*, Vol. 1 (London, 1824), p. 46.

[17] Many of the leases were taken up not for the purpose of settlement but rather for the timber which the land supported. Crown and Clergy Land Papers, Shelves 42, 43, 45, Nos. 2, 6 (Uupublished manuscripts in Archives of Canada, Ottawa).

[18] A survey of Winchester Township, Dundas County, in the late 1820's, indicated that the township was fertile, though in part poorly drained. However, the township had only 11 or 12 inhabitants. The greater portion of the land belonged to the heirs of the Hon. Richard Duncan and Thomas Fraser, both prominent loyalists. The same situation was true of Mountain Township, Dundas County. Andrew Picken, *The Canadas* (London, 1836), pp. 125–6.

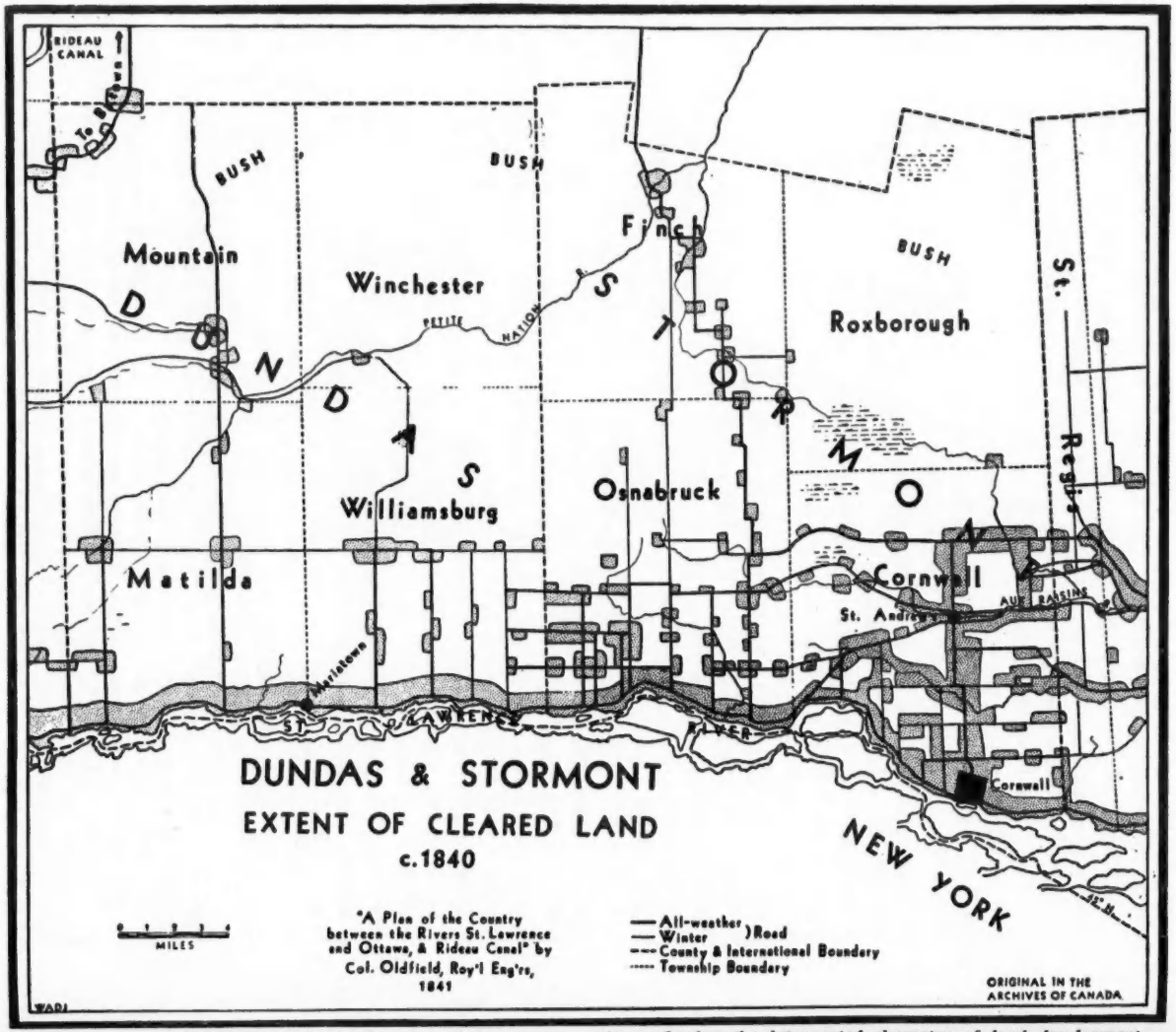

FIG. 3. The extent of cleared land in Dundas and Stormont counties, reflecting the interrupted character of land development.

are presently distributed over the country retard more than any other circumstance, the growth of the colony, lying as they do in detached portions of each township and intervening between the occupations of actual settlers who have no means of cutting roads through the woods and morasses which thus separate them from their neighbours."[19]

By colonial law, every male settler was required to assist in the construction and maintenance of common or concession roads. Usually he met this obligation by tending the clearing across the front of his farm. As a result, concession roads acquired a notorious reputation for being nothing more than sporadic trails which disappeared into the bush at the edge of a reserve or a vacant lot (Fig. 3).

Almost insurmountable difficulties faced the farmer who set out to cart his produce from the interior to the St. Lawrence. No alternative means of reaching the river markets were available, save in Glengary and Leeds counties to some extent, because there were no navigable streams. The Rideau Canal,[20] opened in 1832, afforded an excellent water route for the inhabitants of the northern concessions of the St. Lawrence counties, but with its termini at Kingston on Lake Ontario and at Bytown (Ottawa) on the Ottawa River, it was a long roundabout passage to the St. Lawrence. Because the colonial administration was usually without funds, it was unable to make any significant material contribution to the lives of the inhabitants. All too often even the King's Highways were allowed to degenerate into muddy tracks whose value was limited and seasonal.[21] In fact, so inferior was the highway along the bank of the St. Lawrence that long-distance travelers preferred the American road along the river. Without doubt, the extensive network of roads built by both the proprietors and the state legislature into and throughout northern New York was one of the major factors enhancing the development and prosperity of that area.

The accumulative effects of late 18th century British land policy were clearly evident by 1830. Through the alienation of extensive tracts of land to people who were unable or unwilling to develop them and by the reservation of a large area for the financial support of the administration and the clergy, British policy planners were instrumental in causing the withdrawal from settlement, for nearly half a century, of considerable segments of the most accessible part of the province. Although the British government had begun by 1830 to take steps to meliorate

[19] Kenneth N. Bell and William P. Morrell (eds.), *Select Documents on British Colonial Policy, 1830–1860* (Oxford, 1928), p. 8. It is also interesting to note the official reaction of the Upper Canadian Assembly. The members of the latter body were afraid that the reserves held out "great inducements to future wars with the United States, by affording the means of partially indemnifying themselves [i.e., the Americans] or rewarding their followers in the event of conquest." The fear of aggression was very great among the inhabitants of Upper Canada after the War of 1812. Patterson, *op. cit.*, p. 208.

[20] The Rideau was a costly project, undertaken by the British Government to provide an alternative route to the "exposed" St. Lawrence between Lake Ontario and Montreal. It would have been better, in hindsight, had the money been spent on roads.

[21] Magrath, *op. cit.*, p. 102.

Fig. 3. The extent of cleared land in Dundas and Stormont counties, reflecting the interrupted character of land development.

ORIGINAL IN THE ARCHIVES OF CANADA

the situation, by disposing of the reserves almost in their entirety,[22] it could not immediately liquidate the regressive effects of earlier planning.

The old colonial system, though in the process of decay, survived the American Revolution. In Upper Canada, the presence of scattered reserves and widespread absentee land ownership remained geographical reminders of an aristocratic tradition. Before it was disposed of, the system was to burgeon the dissatisfaction of the population, as it did once before in 1775, into the abortive uprising of 1837.

[22] By 1830, the remaining Crown reserves were transferred to the Canada Land Company and to King's College (University of Toronto), including, respectively, about 80,000 and 17,000 acres in the St. Lawrence counties. At the same time, the gradual disposal of the clergy reserves through sale was permitted.

FUNCTIONS AND OCCUPATIONAL STRUCTURES OF CITIES OF THE AMERICAN SOUTH*

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THE function of urban areas is of major interest to many social scientists, including urban geographers.[1] In 1943 Harris published a functional classification of cities in the United States with more than 10,000 inhabitants, on the basis of 1930 data.[2] Empirical techniques for the functional classification of urban areas as devised by Harris are here applied to the cities of the American South in 1950 (Fig. 1). The objectives of this study are: (a) to discover cities whose function has changed since 1930, (b) to classify cities which have passed the 10,000-population mark since 1930, and (c) to analyze the distribution, size, and occupational structure of cities within each functional category.

The Census definition of the South, with the single exception of the northern panhandle of West Virginia, is used here.[3] This definition obviously includes some cities whose non-southern character makes them valuable for comparative observation. All standard metropolitan areas and cities with more than 10,000 inhabitants in the South are included in this study, with the following modifications: (1) Eleven clusters of cities are treated as single units.[4] (2) Data for central cities in three standard metropolitan areas are used in lieu of data for the standard metropolitan areas because of important differences between the occupational structures of the cities and their standard metropolitan areas.[5]

* The research reported in this paper was made possible by financial support from the General Research Fund of the University of Georgia, to which grateful acknowledgement is made.

[1] Jan O. M. Broek, "The Functions of Urban Areas," *The Professional Geographer*, V (November 1953), pp. 2–5. A recent interdisciplinary study of great value to students of southern cities is Rupert B. Vance and Nicholas J. Demerath, eds., *The Urban South* (Chapel Hill: The University of North Carolina Press, 1954).

[2] Chauncy D. Harris, "A Functional Classification of Cities in the United States," *The Geographical Review*, XXXIII (January 1943), pp. 86–99. Modifications of the Harris classification based on the use of more recent data appear in Grace M. Kneedler, "Economic Classification of Cities," *The Municipal Year Book, 1945* (Chicago: The International City Manager's Association, 1945), pp. 30–38, 48–68; Victor Jones, "Economic Classification of Cities and Metropolitan Areas," *The Municipal Year Book, 1954* (Chicago: The International City Manager's Association, 1954), pp. 31–36, 62–70, 81–108.

[3] *U. S. Census of Population: 1950*, Vol. I, "Number of Inhabitants," p. iv.

[4] These eleven clusters include: Parkersburg and South Parkersburg, West Virginia; Bristol, Virginia-Tennessee; Newport News-Riverview-Newson Park-Hilton Park, Virginia; Fort Lauderdale-Hollywood, Florida; West Palm Beach-Lake Worth, Florida; Pensacola-Warrington-Brownsville-Brent-Goulding, Florida; Gulfport-Biloxi, Mississippi; Florence-Sheffield, Alabama; Monroe-West Monroe, Louisiana; Shreveport-Bossier City, Louisiana; and Texarkana, Arkansas-Texas.

[5] The cities so used are Charleston (including South Charleston), West Virginia; Greensboro and High Point, North Carolina; and Beaumont and Port Arthur, Texas.

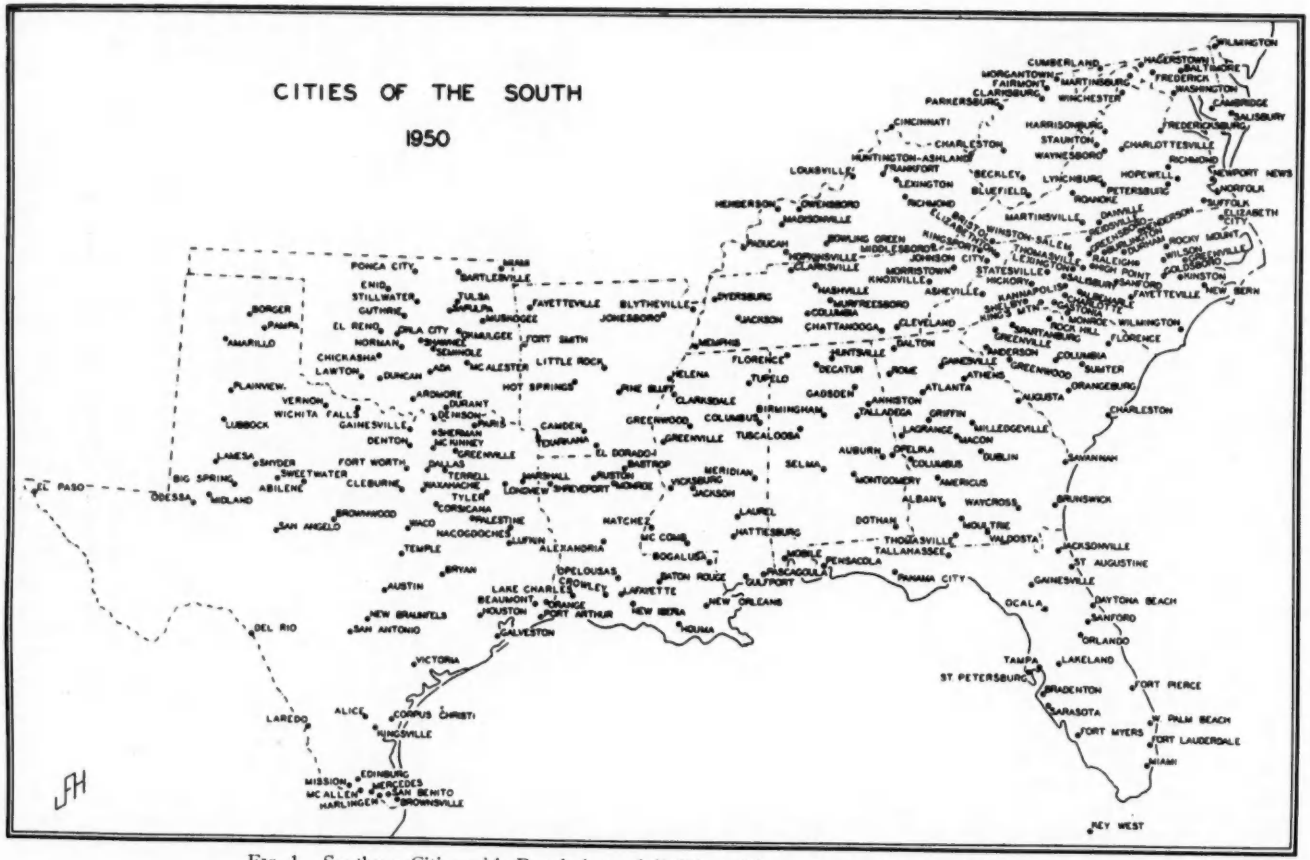

FIG. 1. Southern Cities with Populations of 10,000 or More. See text for modifications.

SYSTEM OF CLASSIFICATION

The classification of urban areas devised by Harris utilized data on *employment,* obtained from each industrial and trading establishment in the city *at the place of work,* and data on *occupation,* obtained from each worker in the city *at his place of residence.* The present study is based entirely on occupational data.[6] The use of a single set of data has the advantage of permitting a more mutually exclusive classification based on the function of the city in terms of the people who live there and what they do. The most serious objection to such a classification is the fact that it may be biased against commuters. This apparent bias was tested in the fifty-nine standard metropolitan areas, each of which includes a city of 50,000 or more inhabitants and one or more counties. It may reasonably be assumed that the great majority of commuters live within the city's standard metropolitan area; so the occupational structure of each standard metropolitan area was compared with the occupational structure of its central city.[7] Only three standard metropolitan areas revealed significant differences; one because of the overwhelming importance of coal mining in the surrounding area, the other two because they each contained two central cities.[8] Throughout the rest of the South, differences between the occupational structure of the central city and of the standard metropolitan area fall within a range of one or two percent. It is therefore concluded that commuting is not a factor of major significance in classifying the functions of southern urban centers.[9] This conclusion seems ample justification for basing a functional classification of southern cities on occupational data alone.

[6] Occupation data contained in the 1950 Census of Population are tabulated both by "occupation group" and by "industry group." Data on employment by industry group are used in this study. These data for each state are contained in Table 35 of the appropriate state part of the *U. S. Census of Population: 1950,* Vol. II, "Characteristics of the Population" (Washington, 1952). It should be noted that the "occupation group" tables of the 1930 census are comparable to those of the 1950 census, but that the 1930 census does not contain the much more useful "industry group" type of table on which this study is based.

[7] To ensure comparability with cities outside standard metropolitan areas, the "urban place" of the 1950 census was used instead of the "urbanized area"; use of the latter would have further reduced these slight differences.

[8] As noted above, occupational data for the central cities were used for these three standard metropolitan areas. *Cf.* fn. 5.

[9] The statistical unimportance of commuting in the present classification is due, in large measure, to the small size of the commuting (urban fringe and rural nonfarm) labor force in relation to the urban labor force. The influence of the urban center (and its function) on the occupational structure of its urban fringe and rural nonfarm labor force varies considerably from city to city. There is an obvious necessity for investigating the occupational characteristics of the urban fringes and rural nonfarm areas adjacent to various types of urban centers. Casual comparison of occupational data for standard metropolitan areas and their central cities generally indicates that tradespeople tend to live in town near the business district, workers tend to live in the industrial fringes, servants (predominantly Negro in the South) tend to live in town and commute to the suburbs, and professional people tend to live in the suburbs and commute to the city. One cannot stress the fact too strongly, however, that these are merely general tendencies and not hard and fast rules.

To facilitate comparison, the number of workers in each of ten major industry groups in each city is computed as a percentage of the total employed labor force of the city.[10] These occupational groups are: mining, construction, manufacturing, transportation and communications, wholesale trade, retail trade, personal services, educational services, other professional services (including medical, business, and repair services, in addition to finance, insurance, and real estate) and public administration. Minimal, quartile, median, and upper decile percentages for each industry group are calculated for all cities in the South (Table I). No southern

TABLE I

PERCENTAGE OF LABOR FORCE EMPLOYED IN SELECTED INDUSTRY GROUPS*

Industry group	Minimal	Lower quartile	Median	Upper quartile	Upper decile	U. S. urban average
Mining	0	0	0	2	7	1
Construction	4	6	7	9	11	6
Manufacturing	5	10	17	26	38	29
Transport and communication	4	6	8	10	14	9
Wholesale trade	1	3	4	5	7	4
Retail trade	13	18	20	22	24	18
Personal services	6	9	11	14	17	7
Education	3	3	4	5	9	4
Other professional services	5	7	8	10	12	10
Public administration	2	3	4	5	12	5
Female ratio	19	43	51	58	64	47
Percentage of total population in employed labor force	21	35	38	41	44	40

* After the percentage of the labor force of each southern city employed in each industry group had been calculated, the percentages employed in each industry group for every southern city were arrayed. This table presents the values of the minimal, quartile, median and upper decile percentages for each industry group.

city, for instance, has less than 13 percent of its employed labor force engaged in retail trade; only a quarter have 13 to 18 percent, half at least 20 percent, a quarter have 20 to 22 percent, and a tenth have 24 percent or more so employed. The *median* values for all ten industry groups indicate the median occupational structure of all southern cities; the *average* occupational structure of the urban population of the United States is included for comparative purposes.

The minimal values for the South may be of considerable significance for quantitative definition of service employment. The minimal value for each industry group is the smallest percentage of persons employed in that group in any southern city; it might be assumed that this is the minimal percentage of workers in each industry group required to make a southern city viable. In other words, at least

[10] The term "city" henceforth refers to the individual study unit, whether city or standard metropolitan area.

43 percent of the workers in every southern city must be engaged in secondary (or service or internal or nonbasic or auxiliary or sustaining) work essential to the functioning of the city; the other 57 percent *may* be employed in providing services and producing goods for regional and extra-regional markets.[11] This tentative conclusion requires further testing in other parts of the United States. Presumably it will not prove valid outside the American culture realm, but if valid in the United States as a whole, it may well serve as a basis for analyses of the basic, or primary, functions of specific American cities.

Harris recognized eight principal types of cities in 1930.[12] Occupational data were used to define transportation centers (T), mining towns (S), and university towns (E). Although Harris used employment data in defining manufacturing cities (M), retail centers (R), diversified cities (D), and wholesale centers (W), the use of occupational data appears equally valid. The category of resort and retirement towns (X) is eliminated in the present classification because it cannot be defined satisfactorily from either employment or occupational data. Two new types, professional centers (P) and military centers (A) have been added, and the diversified cities have been divided into three categories: diversified cities with manufacturing subdominant (M′), diversified cities with retail trade subdominant (R′), and diversified cities (D). Criteria for this classification are presented in Table II, and the functional type of every city in the South under this classification system is shown in Figure 2.

It was initially assumed that many Southern cities could be classified as to function on the "upper decile" principle. If the percentage of the city's employed labor force engaged in a specific industry group were equal to or higher than the regional upper decile for that group, the city would be classified in the appropriate functional category (Table I). The upper decile for manufacturing in the South, for instance, is 38 percent; all cities in which at least 38 percent of the employed labor force is engaged in manufacturing are thus classified as manufacturing centers (Table II). This principle proved satisfactory with respect to manufacturing centers (M) and transportation centers (T). Tentative classification of mining towns (S), wholesale centers (W), and educational centers (E) by the same princi-

[11] The problem of basic and nonbasic employment is treated exhaustively in John W. Alexander, "The Basic-Nonbasic Concept of Urban Economic Functions," *Economic Geography*, XXX, No. 3 (July 1954), pp. 246–261. To use Alexander's term, the *minimum* B/N ratio in any Southern city would be approximately 100:75, since the minimal values for each industry group total 43 percent. It is obvious that much larger percentages of the employed labor force could be engaged in nonbasic activities, thus permitting B/N ratios considerably higher than 100:75. This agrees with Alexander's conclusions, with the single exception of Oshkosh, which has a B/N ratio of only 100:60. Two explanations are feasible: (1) Too many persons in Oshkosh were included in the basic category. The transfer of 900 persons from basic to nonbasic categories, for instance, would produce a B/N ratio of 100:75. (2) The minimal B/N ratio for the South is higher than for the entire nation. This might be explained by the larger numbers employed in personal service. Complete exclusion of personal service produces a minimal B/N ratio of approximately 100:59.

[12] Harris, *op. cit.*, p. 88.

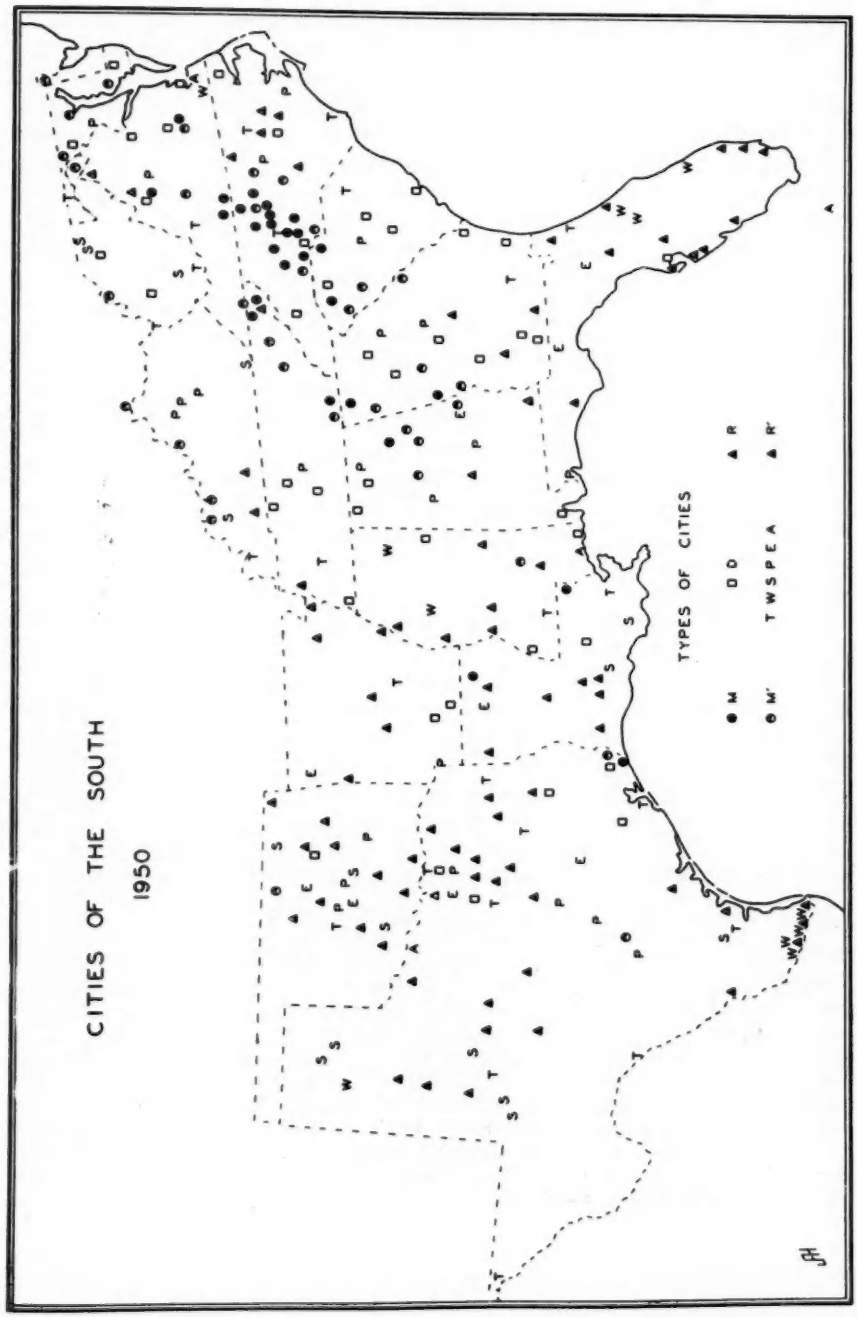

FIG. 2. Cities of the South Classified as to Functional Type. See Table II for classification criteria.

ple, however, revealed that the upper decile value was a little too low to exclude certain cities whose assemblages of industry groups rendered them inappropriate to these categories. In consequence, a value slightly higher than the upper decile was used to delimit these categories; for similar reasons, a value slightly lower than the upper decile was used in defining professional (P) centers (cf. Tables I and II). Almost half of the cities of the South are classified on the upper decile principle. Four additional cities are classified as military centers (A) because more than ten percent of the *entire* population is in the armed forces.

TABLE II

CRITERIA USED IN CLASSIFYING CITIES AS TO FUNCTIONAL TYPE

Type	Criteria
M	At least 38% of employed labor force in manufacturing; manufacturing group twice as large as retail trade
M′	Manufacturing force 1.5 times as large as retail trade force; at least 26% of labor force engaged in manufacturing
D	Manufacturing force exceeds retail trade force; manufacturing 19–28%, retail trade 16–22%
R′	Retail trade force exceeds manufacturing force; at least 19% of employed labor force in retail trade
R	Retail trade force twice as large as manufacturing force; at least 21% of employed labor force in retail trade
T	At least 14% of employed labor force in transportation and communication
S	At least 11% of employed labor force in mining
W	At least 8% of employed labor force in wholesale trade
P	At least 24% of employed labor force in education, public administration, and professional services
E	At least 17% of employed labor force in education alone*
A	At least 10% of total population in armed forces

* The educational center (E) is essentially a subtype of the professional center (P) with greater emphasis on education.

Most of the remaining cities of the South are "typical." They are therefore classified in terms of their assemblages of industry groups rather than in terms of a single statistically dominant group. The relation between employment in retail trade and in manufacturing proved most useful. Retail cities (R), for instance, have more than twice as many workers employed in retail trade as in manufacturing (Table II).[13] Retail workers hold a bare majority over manufacturing workers in diversified cities in which retail trade is subdominant (R′). In diversified cities with manufacturing subdominant (M′), on the other hand, the manufacturing force is half again as large as the retail trade force. The manufacturing force exceeds the retail trade force in diversified cities (D), but not by as much as fifty percent.

CHANGES IN CLASSIFICATION SINCE 1930

One of every three Southern cities in 1950 is classified in a functional category different from that in which Harris placed it, although many of these differences

[13] Note that manufacturing cities (M) have more than twice as many workers employed in manufacturing as in retail trade, although this was not used as a diagnostic characteristic.

are illusory (Table III). Since the system of classification used in 1950 is similar to but not exactly the same as the system used by Harris, some differences are inevitable. The 1950 classification, for instance, abandons one type, the resort and

TABLE III

NUMBER OF CITIES FUNCTIONALLY RECLASSIFIED IN 1950 FROM 1930

1930	Functional classification 1950											Total number of cities
	D	R	R′	T	M	M′	W	S	E	P	A	
D			9	7	1	5		2		6		30
R	1			6			3	2	1	7	1	21
T	5		3							1	1	10
M	5		2	3						2		12
W	1		6							2		9
S				1								1
E	1											1
X	2	4		1							2	9
Total	15	4	20	18	1	5	3	4	1	18	4	93

retirement (X) city, and introduces two new ones, professional (P) and military (A) centers; this single factor accounts for almost one-third of the changes since 1930 (Table IV). Another fifth of the changes are slight shifts in the shadow

TABLE IV

NUMBER OF CITIES WITHIN EACH FUNCTIONAL CLASSIFICATION, 1950, AND CHANGE SINCE 1930

Functional classification in 1950	Classification unchanged since 1930	Classification changed since 1930	Passed 10,000 in population since 1930	Total
M	13	1	12	26
M′	22	5	8	35
D	18	15	11	44
R′	17	20	15	52
R	15	4	12	31
T	5	18	2	25
S	2	4	10	16
W	3	3	5	11
P	1	18	4	23
E	4	1	4	9
A		4		4
Total	100	93	83	276

zone between diversified cities, diversified cities with retail trade subdominant, and diversified cities with manufacturing subdominant. In other words, functional changes in 51 of these 93 cities may be more apparent than real.

The remaining 42 cities, however, seem to have undergone some significant change in primary function since 1930. The greatest gain has been in new transportation centers, especially in the western part of the South. Former retail cen-

ters, such as the Texas cities of El Paso, Big Spring, Del Rio, Cleburne, and Palestine, are now classified as transportation centers, as are such former diversified cities as Denison and Marshall in Texas and Pine Bluff, Arkansas. Former diversified cities in the east which are now classified as transportation centers include Jackson, Tennessee, McComb, Mississippi, Waycross, Georgia, and Rocky Mount, North Carolina. Transportation is now the primary function of some former manufacturing towns, such as Paducah, Kentucky, Huntington, West Virginia, and Salisbury, North Carolina; of the former retail center, Florence, South Carolina; of the former mining town, Bluefield, Virginia-West Virginia; and of the former resort center, St. Augustine, Florida.[14]

Diversified cities with retail trade subdominant show the second largest increase. That category now includes the former wholesale centers of Dallas and Waco, Texas, Albany and Valdosta, Georgia, Hopkinsville, Kentucky, and Wilson, North Carolina, in addition to the former transportation centers of Monroe, Louisiana, Meridian, Mississippi, and Jacksonville, Florida. Five of the six new diversified cities (Columbus, Mississippi, Decatur, Alabama, Spartanburg, South Carolina, Elizabeth City, North Carolina, and Clarksburg, West Virginia) were formerly classified as manufacturing centers, and one, Memphis, Tennessee, as a wholesale center. The category of mining cities now includes the former retail centers of Pampa, Texas, and Seminole, Oklahoma, in addition to the former diversified cities of Bartlesville, Oklahoma, and Middlesboro, Kentucky. Amarillo and San Benito, Texas, and Orlando, Florida, formerly retail centers, are now wholesaling cities. Tallahassee, Florida, has changed from a retail center to an educational center, and Greenville, South Carolina, has changed from a diversified to a manufacturing city.

Manufacturing centers have maintained the greatest resistance to any change in function. They are closely followed in this respect by diversified cities with manufacturing subdominant, retail trade centers, and educational centers (Table IV). Transportation centers have made the greatest increase, followed by diversified centers and diversified cities with retail trade subdominant. Of the cities which have passed the 10,000-population mark since 1930 disproportionately large numbers are manufacturing and mining towns, whereas transportation centers and diversified cities with manufacturing subdominant are poorly represented (Table IV). Retail centers, wholesale centers, and educational centers have made slight gains, percentage-wise, whereas diversified cities with retail trade subdominant and diversified cities have lost slightly.

FUNCTIONAL STRUCTURE OF SOUTHERN CITIES

Manufacturing, retail trade, and personal services are the three leading industry groups in the urban South. These three groups, not necessarily in the same

[14] Bluefield illustrates the problem of trying to compare cities classified under two different systems. Harris notes that inadequacy of data resulted in the classification of Bluefield as a mining center, whereas it probably should have been considered a transportation center. Harris, *op. cit.*, fn. 12, p. 94.

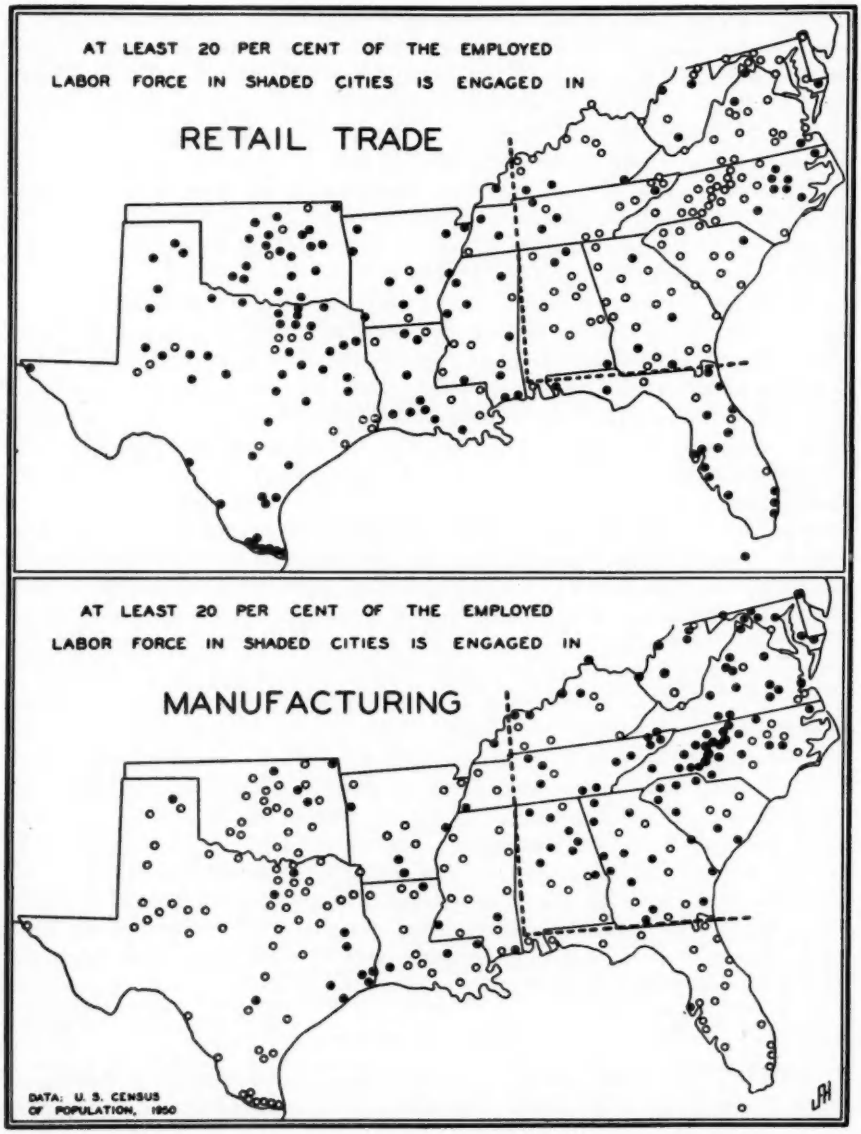
AT LEAST 20 PER CENT OF THE EMPLOYED
LABOR FORCE IN SHADED CITIES IS ENGAGED IN
RETAIL TRADE
AT LEAST 20 PER CENT OF THE EMPLOYED
LABOR FORCE IN SHADED CITIES IS ENGAGED IN
MANUFACTURING
DATA: U. S. CENSUS
OF POPULATION, 1950
JH

FIG. 3. Southern Cities in Which at Least 20 Per Cent of the Employed Labor Force is Engaged in Retail Trade or Manufacturing. All other cities are indicated by open dots.

order, are the three largest industry groups in half the cities of the South, and at least two of the three are among the three largest groups in 95 percent of Southern cities. They consequently merit separate consideration before the functional structure of individual types of cities is analyzed.

The cleavage between manufacturing and retail trade in Southern cities is highlighted by a line drawn south from the mouth of the Wabash generally paralleling the Mississippi-Alabama line, and then turning eastward to the Atlantic Ocean along the northern boundary of Florida (Fig. 3). Three-quarters of the

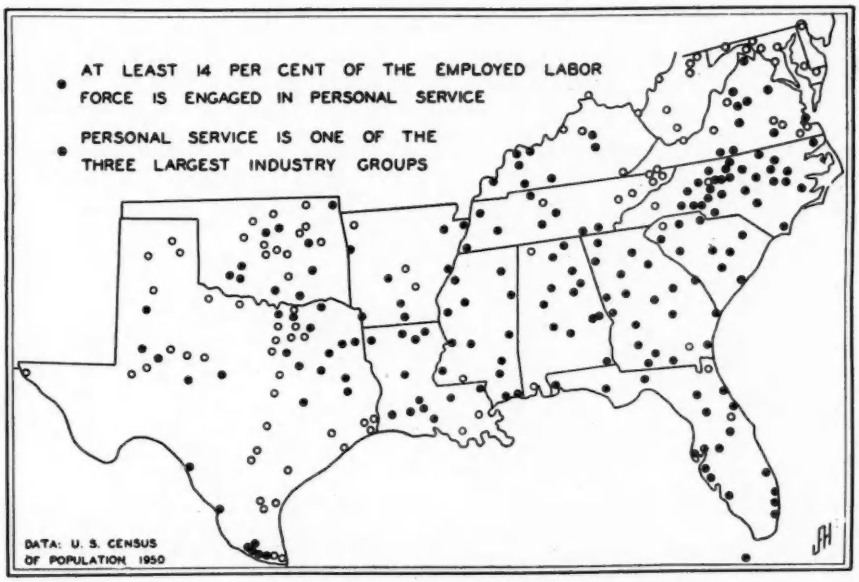
AT LEAST 14 PER CENT OF THE EMPLOYED LABOR FORCE IS ENGAGED IN PERSONAL SERVICE
PERSONAL SERVICE IS ONE OF THE THREE LARGEST INDUSTRY GROUPS
DATA: U. S. CENSUS OF POPULATION 1950
JFH

FIG. 4. Personal Service Employment in Southern Cities

manufacturing cities of the South are north and east of this line, whereas three-quarters of the retail trade centers are south and west of it. Manufacturing is the leading industry group in three of every four cities to the north and east, whereas retail trade is the leading industry group in three of every four cities to the south and west. This line marks a relatively sharp divide in the geography of the urban South.

The relatively large percentage of the employed labor force which is engaged in personal service is a striking characteristic of the cities of the Deep South (Fig. 4). One of every seven persons in the labor force is so employed in a quarter of the cities of the South. Except for the Nashville Basin and peninsular Florida, the distribution of these cities coincides fairly closely with the areas having highest ratios

of Negro population. The relation between Negroes and personal service is obvious. The distribution of cities in which personal service is one of the three largest industry groups indicates the general extent of the area dominated by the Deep South tradition of personal service. With the exception of Maryland, the Appalachians, Oklahoma, and central and western Texas, personal service is an important facet of the occupational structure of virtually every southern city. It should also be noted that personal service is less important in manufacturing cities than in retail and diversified cities. It might be assumed, therefore, that personal service will play a role of decreasing importance in the South as industrialization advances.

TABLE V

NUMBER OF CITIES WITHIN EACH FUNCTIONAL CLASSIFICATION, 1950, BY SIZE OF EMPLOYED LABOR FORCE

Functional classification	Size of employed labor force					Total number of cities
	Under 5,000	5,000–7,500	7,500–12,500	12,500–30,000	Over 30,000	
M	6	7	7	2	4	26
M′	6	7	5	6	11	35
D	8	9	7	4	16	44
R′	13	10	12	9	8	52
R	5	11	7	3	5	31
T	5	5	6	4	5	25
S	4	6	6			16
W	5	3	1		2	11
P	3	5	4	3	8	23
E	2	3	4			9
A		1		1	2	4
Total	57	67	59	32	61	276

The female ratio, defined as the number of females per 100 males in the employed labor force, is apparently related to manufacturing and personal service industry groups in southern cities (Fig. 5). This ratio is unusually high in textile manufacturing towns and in towns where the personal service industry is important (Table VI). It is also high in educational centers. On the other hand, the female ratio is unusually low in heavy industry centers, such as Birmingham and Gadsden, Alabama, in the petro-chemical manufacturing cities along the Gulf Coast, in southern Texas, and west of the 100th meridian.

Manufacturing cities (M) are concentrated primarily in the Piedmont textile belt between Danville, Virginia, and Greenville, South Carolina (Fig. 6).[15] This belt is paralleled on the northwest by the manufacturing towns of the Great Valley between Gadsden, Alabama, and Waynesboro, Virginia. Of the five M cities outside these two belts, two (Hopewell, Virginia, and Port Arthur, Texas) are chemical

[15] For a more detailed treatment of the cities of the Piedmont textile belt, see Eugene Mather and John Fraser Hart, "Industry in the Deep South and the Border States," *Tijdschrift voor Economische en Sociale Geografie*, Vol. 45, No. 5/6 (May–June 1954), pp. 108–112.

manufacturing centers, two (Bastrop and Bogalusa, Louisiana) are pulp and paper processing centers, and La Grange, Georgia, is a textile manufacturing center. The M cities for the most part have fewer than 12,500 workers in the employed labor force, and Greenville, South Carolina, the largest, has only 68,000 (Table V). A large percentage of the population is employed, and these cities have notably high ratios of employed females (Table VI). Such a large percentage of the employed labor force is engaged in manufacturing that the percentages employed in other industry groups drop to the minimal level for the South.

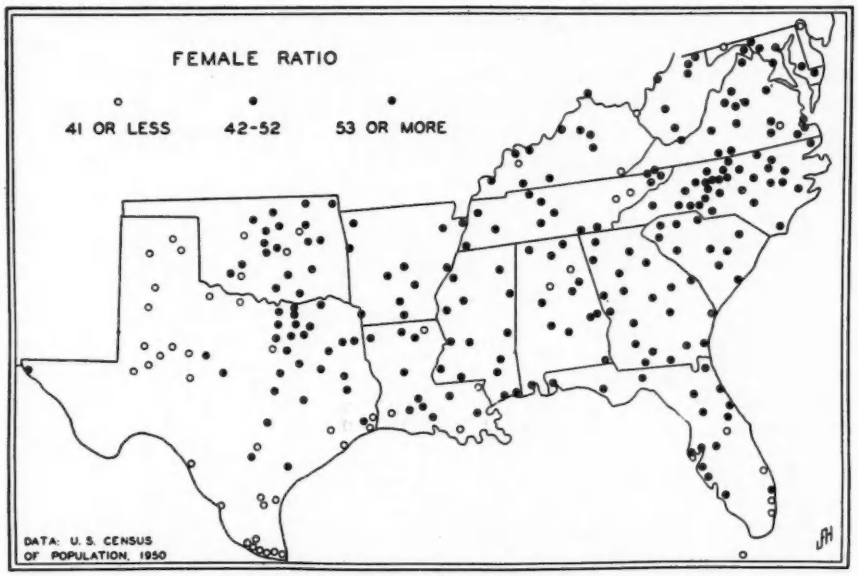

FIG. 5. Female Ratio in Employed Labor Force in Southern Cities

Diversified cities with manufacturing subdominant (M′) within the South are more or less concentrated in five general areas: along the northern margin in Delaware and Maryland and in the Ohio Valley, in the Piedmont textile belt, along the Great Valley of eastern Tennessee, and along the Alabama-Georgia line (Fig. 6). The M′ cities are similar to the M cities in some ways, but tend to be larger and more diversified. The M′ category includes almost a fifth of the standard metropolitan areas of the South. Only about a third of the employed labor force is engaged in manufacturing, and slightly higher percentages than in M cities are employed in other industry groups (Table VI). There are some regional variations in occupational structure within the cities of this category. The M′ cities of Maryland and Delaware are close to the median occupational structure for the entire group, with slightly greater emphasis on professional services and slightly less on

personal service. The female ratio and the percentage employed in personal service in the M′ cities of the Ohio Valley are lower than the group medians, whereas retail trade, professional services, and transportation are somewhat more important. In the textile towns of the Piedmont and the Alabama-Georgia border the female ratios and personal service percentages are higher than the group medians, whereas the reverse is true of the M′ cities in the Great Valley.

Diversified cities (D) are scattered throughout the South, with the greatest concentration in Georgia and South Carolina (Fig. 6). This category includes one-fourth of the standard metropolitan areas of the South, and three-fifths of the D cities have more than 7,500 persons in the employed labor force (Table V). Both manufacturing and retail trade are important, but neither achieves a position of subdominance. The 44 cities in this category might well be considered the "typical" cities of the South, as the median occupational structure of D cities, with the exception of manufacturing, is virtually identical with the median occupational structure of all southern cities (Table VI).

TABLE VI

MEDIAN VALUES FOR PERCENTAGE OF LABOR FORCE EMPLOYED IN SPECIFIED INDUSTRY GROUPS, BY FUNCTIONAL TYPES OF CITIES, 1950*

Industry group	All southern cities	Functional types of cities										
		M	M′	D	R′	R	T	S	W	P	E	A
Mining	–	–	–	–	–	1	–	18	–	–	–	–
Construction	7	5	7	7	8	9	7	9	7	7	8	8
Manufacturing	17	45	32	23	16	9	14	7	9	11	6	11
Transport and communication	8	5	7	8	8	8	16	7	7	7	5	8
Wholesale trade	4	2	3	4	5	4	4	4	9	4	2	4
Retail trade	20	15	17	19	22	24	20	20	21	20	18	21
Personal service	11	9	11	14	12	11	10	8	9	11	15	10
Education	5	3	3	4	4	4	4	3	4	5	24	3
Other professional	8	5	8	8	9	9	8	7	8	10	8	9
Public administration	4	3	3	4	4	4	4	3	3	9	4	12
Percentage of total population in employed labor force	38	43	40	39	38	37	38	39	42	37	34	28
Female ratio	51	57	52	53	52	44	46	36	47	52	59	43

* The value for each industry group in each functional type of city is the median value of percentages of the labor force employed in the specified industry group in every city within the specified functional category.

Diversified cities with retail trade subdominant (R′) are widespread in the South, with a tendency toward concentration west of the Mississippi River (Fig. 6). Although this category includes Dallas, Texas, with more than a quarter million workers, and Tulsa, Oklahoma, with 100,000, the majority of the R′ cities are small (Table V). These are essentially regional market or trading centers with some light manufacturing for the local market. The median occupational structure

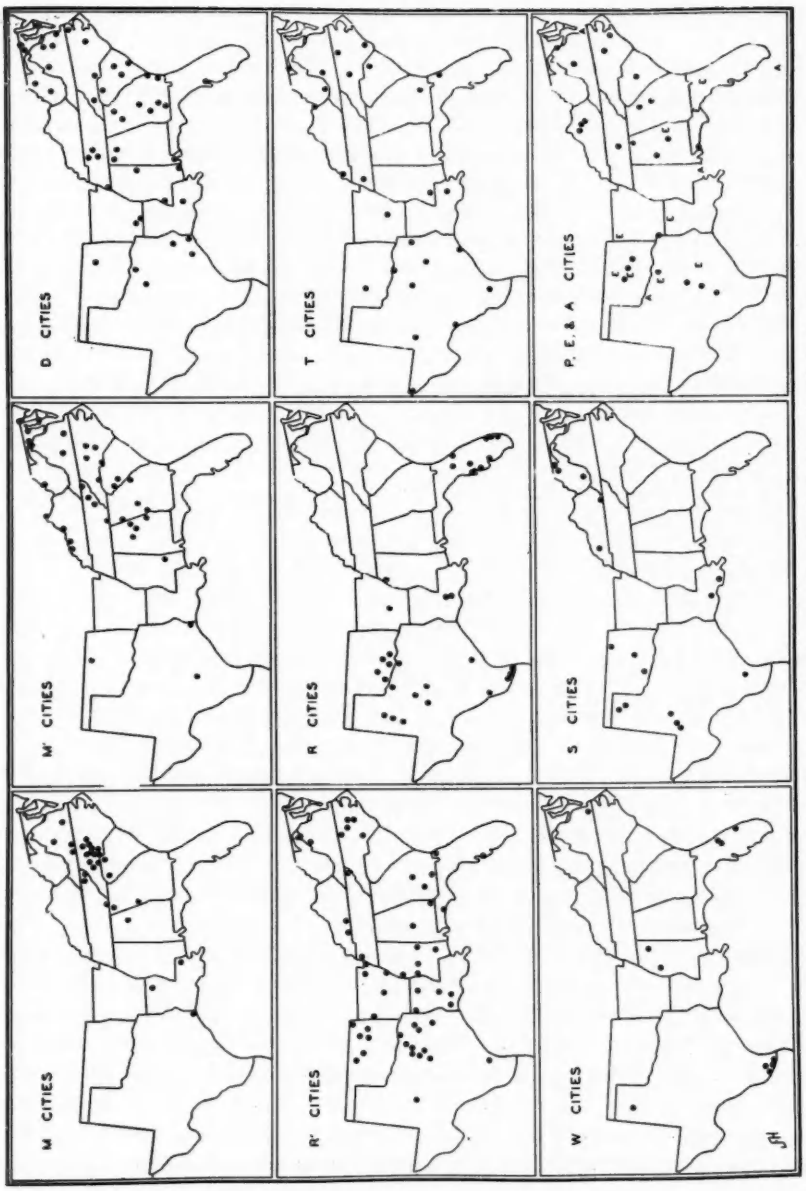

FIG. 6. Distribution of Southern Cities in Each Functional Category

of the R′ cities is almost identical with the median occupational structure of all southern cities, with slightly greater emphasis on retail trade and on personal service (Table VI).

Retail trading centers (R) are concentrated in peninsular Florida and in north central Texas and south central Oklahoma (Fig. 6). The majority of these cities are of medium size, with an employed labor force ranging from 5,000 to 12,500 workers (Table V). The R cities are regional trading centers *par excellence.* Approximately a quarter of the employed labor force is engaged in retail trade, but only one of every ten persons is working in a manufacturing establishment. The female ratio is lower than for any other urban type except mining towns and military centers (Table VI). The R cities of peninsular Florida are distinctive for their considerably higher female ratios (median, 56) and percentages employed in personal service (median, 17 percent). Mining is a minor element in the median occupational structure of the R cities because the majority of these cities are located in oil producing regions. The percentage employed in mining is nowhere as high as 10 percent, however, and in three-quarters of the R cities fewer than one person in twenty is employed by oil companies.

Transportation centers (T) are widely dispersed in the South (Fig. 6). They range in size from New Orleans, Louisiana, with a quarter million workers in the employed labor force, to Del Rio, Texas, with less than four thousand. Twenty of the twenty-five transportation centers have large rail yards and shops, and El Paso, Texas, has important air facilities in addition. Galveston, Texas, and New Orleans, Louisiana, are ocean ports, and Charleston, South Carolina, is both port and naval base. Paducah, Kentucky, and Huntington, West Virginia-Ashland, Kentucky, are coal shipping ports on the Ohio River, and in addition the latter is an important rail center with considerable manufacturing. With the exceptions of Huntington-Ashland, Cumberland, Maryland, and Salisbury, North Carolina, the transportation centers have very little manufacturing, as is indicated by the median occupational structure for T cities (Table VI). The female ratio in these cities is low, and an unusually large percentage of the working force is engaged in transportation, but otherwise the median occupational structure of the T cities is relatively close to the median occupational structure of all southern cities.

Wholesale centers (W) are located, for the most part, in areas where specialized types of agricultural produce must be assembled, packed, and marketed (Fig. 6). Four of the eleven cities of this type are in the rich truck and citrus region along the lower Rio Grande; Sanford and Fort Pierce are in the Florida truck and citrus belt; and Suffolk, Virginia, is a peanut processing town. The largest of these towns, Suffolk, has only slightly more than 5,500 workers in the employed labor force. The four larger W cities, Tupelo and Greenwood in Mississippi, Amarillo, Texas, and Orlando, Florida, are regional distribution centers. The median occupational structure of the W cities indicates that manufacturing is of purely secondary impor-

tance, whereas both wholesale trade and retail trade exceed the median values for all southern cities (Table VI).

Mining towns (S) are localized with respect to mineral resources (Fig. 6). Beckley, Fairmont, and Morgantown are in the West Virginia section of the Appalachian coal field; Middlesboro, Kentucky, is in the same field. Madisonville, Kentucky, in the western Kentucky field, is the only other coal mining town in the South. The other S towns are all oil towns, including such striking examples as Bartlesville, Oklahoma, and Snyder, Texas, where 34 and 39 percent, respectively, of the employed labor force are engaged in the mining industry. The mining towns are small; only Clarksburg, West Virginia, and Odessa, Texas, have as many as 10,000 employed workers, and the majority have less than 7,000. The female ratio is considerably lower than for any other type of city, but the percentage of employment is relatively high (Table VI). Three aspects of the median occupational structure are worthy of note: the high percentage employed in mining, the relative insignificance of manufacturing, and the fact that the percentage employed in retail trade is exactly the same as the median for the entire South.

Professional centers (P), *educational centers* (E), and *military centers* (A) are discussed together because of their functional similarity. Professional centers are those in which the combination of professional services, educational services, and public administration occupy a quarter of the labor force. Educational services alone occupy 17 percent of the labor force in educational centers. Military centers, although defined in terms of total population, commonly have a large percentage of the labor force engaged in public administration.

Colleges or universities dominate two cities each in Oklahoma, Texas, and Florida, and one each in Arkansas, Louisiana, and Alabama, although Tallahassee, Florida, also has important political functions (Fig. 6). The E cities are small, with extremely high female ratios and insignificant manufacturing (Table VI). At least half of the labor force in every one of these cities is in three industry groups: educational services, retail trade, and personal service.

Education is also an important function of some of the P cities. Charlottesville, Virginia, Athens, Georgia, and Murfreesboro, Tennessee, are predominantly educational centers, whereas educational and political functions are combined in Austin, Texas, Raleigh, North Carolina, and Columbia, South Carolina. The capital cities of Washington, D. C., and Frankfort, Kentucky, are primarily political in function. Political and military functions are combined in Oklahoma City, Oklahoma, and Montgomery, Alabama. Hospitals or medical centers are of primary importance in Shawnee, Oklahoma, McKinney, Texas, Temple, Texas, Richmond, Virginia, and Milledgeville, Georgia, whereas medical and educational functions are combined in Lexington, Kentucky, and Tuscaloosa, Alabama. San Antonio, Texas, combines medical and military functions. Military installations play an important role in the economies of Texarkana, Texas, Huntsville, Alabama, Pensacola, Florida, and New Bern, North Carolina, but the four Southern cities most completely dom-

inated by the military are Norfolk, Virginia, Key West, Florida, Biloxi, Mississippi, and Wichita Falls, Texas.

The median occupational structure of the professional centers is similar to that for the entire urban South, with less emphasis on manufacturing and more on professional services and public administration. Military centers, on the other hand, have strikingly lower female ratios, greater emphasis on retail trade and public administration, and less on education.

ABSTRACTS OF PAPERS PRESENTED AT THE 51ST ANNUAL MEETING OF THE ASSOCIATION OF AMERICAN GEOGRAPHERS, MEMPHIS, TENNESSEE, APRIL 11–14, 1955

(CONCLUDED)

CLARENCE B. ODELL—*Research in the Design and Use of Geography Teaching Materials: An Aspect of Applied Geography*

The design and use of geography teaching materials is an important and sometimes overlooked aspect of applied geography. Map making is usually recognized as applied geography, but the study of map and globe use in teaching geography and the consequent planning and designing of geography teaching materials are often overlooked and perhaps even ignored as an aspect of applied geographical research. The available globes and maps and related materials, and the ineffective uses some teachers make of them, point out to geographer-cartographers ". . . the need for improving their cartographic methods, both in the techniques of field and office research and in the classroom presentation of geography from the elementary grades to the graduate school."[1] To analyze geographic information for presentation in the form of statistical tables and charts, photographs and pictorial drawings, maps and explanatory texts for use at various levels of instruction will greatly aid teachers and pupils in their study of "the world we live in." Such a task is indeed in the field of applied geography and a task well suited for the professional geographer.

As has been stated by one or more members of the Association of American Geographers, map making is not just a technician's job—it is a scholar's job. There is a challenge to those who know map design and construction to assist in the spread of map reading skills to many thousands of teachers. It is an accepted fact among educational circles that many teachers are unaware of the great potentials of teaching geography through a wise and more efficient use of the maps and globes we now have. There is a challenge also to assist in studies established for the purpose of determining how students learn from various kinds of graphic materials in order that new materials can be developed as needed.

Although few departments of geography within the United States recognize in their curricula the need for study devoted solely to the design and methods of using graphic materials for teaching purposes, many individual members of the AAG have done much to increase the spread of geographic knowledge in the field of education. Witness the large number of elementary and secondary texts and the great number of articles written by geographers in educational periodicals. Witness the participation of outstanding geographers in the activities of the National Council of Geography Teachers, the National Council of Social Studies, and other organizations dealing with the presentation of subject matter.

[1] *American Geography: Inventory and Prospect* (1954), pp. 555–6.

It is to an assembled group, members of the Association of American Geographers, interested in the field of applied geography and more especially to those interested in increasing the knowledge of geographical understanding that the challenge is made. More and more study should be given by geographers to the design and use of geography teaching materials if geographers are to contribute to the fullest extent in the spread of geographic knowledge.

RALPH E. OLSON—*Water in Oklahoma: A Limited Resource*

The people of Oklahoma, a state which has lost population during the last twenty-five years and is still losing population in many areas, are keenly aware that water is a critical resource in the future development of their state. While the amount of rainfall received is roughly similar to that which falls on a comparably sized area in the eastern Corn Belt, the water shortage is more severe in Oklahoma for four reasons: (1) the greater irregularity of the rainfall from year to year and from season to season, (2) the steeper gradient of the streams which makes for more rapid runoff, (3) the higher evaporation rate during prolonged periods of high temperature and low humidity, and (4) the unsuitable mineral quality of some of the surface and subsurface waters. The wide floodplains and porous beds of the major rivers make dam construction expensive, and the shallow artificial lakes, which take valuable farmland out of production, silt in rapidly. The shifting shorelines of some of these lakes, which were built for the most part as multiple-purpose projects subsidized by the federal government, lessen their usefulness for recreation. Furthermore, the recreational and electrical power functions of these lakes work at cross purposes with the flood-control and irrigation functions. The attendant conflicts of interest present economic and political problems of remarkable geographic complexity. Plans are under consideration for the creation of a central authority in the state which would have legal control over the state's water resources and directive responsibility for their wise utilization.

ELDON J. PARIZEK AND JAMES F. WOODRUFF—*Influence of Underlying Rock Structures on Valley Profiles in the Georgia Piedmont*

Physiographic studies in the Georgia Piedmont have revealed a close correlation between surface lithology and the longitudinal and transverse profiles of stream valleys. Piedmont drainage is generally southeast, which is normal to the strike of the underlying crystalline rocks. The strike and differential resistance to erosion of Piedmont rocks precisely control valley development and shape. This general relationship is demonstrated by several complete longitudinal profiles, and a large-scale profile of a portion of the Oconee River is presented as a representative type. Included in the discussion are the correlations between valley shape, gradient, lithologic types, joints, and linear structures. A detailed study of a typical Piedmont tributary valley, using maps, profiles, and geologic structures, corroborates more accurately the lithologic influences indicated by observations of major stream valleys. While terraces along the trunk streams undoubtedly developed by accepted

methods of rejuvenation, such as uplift, fluctuating shorelines, etc., close examination of the tributary valley indicates that some rejuvenation and terrace formation has been controlled by subsurface topography of intrusive igneous bodies. This new hypothesis may account for some of the multi-cycle erosion in the Georgia Piedmont, and it is suggested that subsequent studies of valley types in similar crystalline areas should consider it as well as lithology.

WILLIAM D. PATTISON—*A Review of the Users of Public Land Survey Records as Descriptive Sources*

The United States public land surveys, formerly conducted by the General Land Office and now under the supervision of the Bureau of Land Management, have had for their primary objective the subdivision of lands in the U. S. public domain prior to sale. These surveys, begun in 1785 and now somewhat over ninety per cent complete, have laid down a basic cadastral grid over the surface of the twenty-nine public land states of the Union. In addition to this they have yielded in the form of notes and plats descriptions of distinct geographic value.

The use of public land surveyors' descriptions as sources of currently valid information was especially widespread among the principal publishers of state and national maps in the middle and late nineteenth century. Though this was the period of their greatest use it should be recognized that these descriptions were reproduced in emigrants' guides as early as 1818, and that data drawn from them appear in such a relatively recent publication as the *Atlas of American Agriculture* (1936).

Interest in these records as sources of historical information appears to be altogether a twentieth century phenomenon. There has usually been a considerable time lag between the passing away of conditions described and the rise of an interest in their reconstruction. From the beginning of reconstruction attempts (believed to have been *circa* 1905) to the present, attention has centered on the extent and general composition of forest cover. Second to this has been a concern with early trails.

Geographers, along with historians, botanists, and others, have had recourse to the public land survey records for information on past landscapes. Reconstructions by geographers, however, remain surprisingly limited in number. A review of work done to date by geographers indicates a definite tradition originating in the work of a few pioneers, which promises to become increasingly important in the future.

N. J. G. POUNDS—*The Eastern and the Western Ruhr: A Comparison of the Ruhr and Upper Silesian Industrial Districts*

The industrial regions of Upper Silesia and the Ruhr have many features in common in both their geography and the history of their development. There are certain similarities in geological structure and in the association of iron ore deposits with easily worked coal seams.

Political and social influences on the development of the two areas have been quite different. The Ruhr was open to the capital and skills of the West. Upper Silesia, though united under Prussian rule at an earlier date than the Ruhr, suffered from the feudal structure of society. The owners of the great Silesian estates did not make good entrepreneurs, while the Ruhr became the classic area of the development of integrated *Konzerne*.

The iron ore resources of the Ruhr were exhausted at an early date, while imports of ore into Upper Silesia were small, until the present century. On the other hand the Ruhr coal field is richly endowed with coal of good coking quality, whereas Upper Silesian coal is generally less suited for this purpose. Throughout the 19th century a high proportion of the Upper Silesian coal was used in the smelting of iron-ferrous metals, especially lead and zinc.

The Ruhr area lay close to the consuming centers of Western Europe and had the advantage of river and canal transport. The early advantage of Upper Silesia was that it lay close to the Austrian boundary, along which the munitions produced here were most likely to be wanted. The strategic advantage was of diminishing importance, and the distance of Upper Silesia from the chief German markets has been a major obstacle to its industrial development.

Early expectations regarding Upper Silesia were not realized, and in terms of coal, iron and steel production Upper Silesia was overtaken by the Ruhr in the second half of the 19th century. The whole coal field area was unified under German control in 1939, and the peak of coal production was achieved in 1943. Now the whole area is under Polish and Czechoslovak control, and, under the direction of the Soviet planning authorities, a coal production as great as that of the Ruhr is anticipated. Iron and steel production is appreciably less than in the Ruhr, but if proposed water connections with the Ukraine are completed the *Eisenkombinat Oberschlesien* will use ore from Krivoi Rog. The shortage of coking coal will remain a deterrent to the construction of an iron and steel industry comparable with that of the Ruhr, but it is possible that the opening of fresh mines in Pless and the introduction of new coking processes will overcome even this disadvantage.

WILLIAM E. POWERS—*Glacial Landforms and Associated Shoreline Features of Coastal New England*

Present coastal landforms are related to the complex geomorphic history of New England. Ancient crystalline and sedimentary rocks underlie all the region save Cape Cod, which is on weak Coastal Plain sediments. Preglacial erosion developed a rolling upland. Then glaciers from the north removed residual soils, scoured uplands, and deposited drift which thickens toward the south. A glacial lobe in Cape Cod Bay was associated with moraine and outwash on its west margin from Plymouth southward and on the south part of Cape Cod. Melting of the glacier left a drowned, embayed coast. Subsequent shore processes have modified considerably the southern region of drift, but have caused little change in the

rocky Cape Ann and Camden areas. Wind has built high dunes in certain areas, but rain wash and streams have accomplished little. Extensive salt marsh deposits have accumulated about the tidal streams.

The glacier, when it melted, left seven major landform types:

1. High rough moraine, mainly south of Plymouth (Ellis moraine) and the central ridge (Sandwich moraine) of Cape Cod.
2. Low rolling moraine (the Scorton) between the Sandwich moraine and Cape Cod Bay.
3. High rough pitted outwash plain (the Wareham) associated with the Ellis moraine.
4. Low pitted outwash plain—the Mashpee plain south of the Sandwich moraine, and low areas amidst the Scorton moraine.
5. Low non-pitted outwash plain—a few parts of the Mashpee plain.
6. Rough bedrock upland—the rougher areas between Camden and Rockland, Maine.
7. Flat or gently rolling bedrock upland—the rocky interior of Cape Ann.

Each of the seven glacial landform types is now associated with secondary shoreline forms developed mainly by wave action. These are described in this paper and typical associations of glacial and secondary forms are given.

MERLE PRUNTY, JR.—*Changes in Settlements on the Deltapine Plantations, 1939–1954*

Delta and Pine Land Company ("Deltapine") operates sixteen contiguous plantations in Bolivar County, Mississippi; the combined holdings of 38,000 acres constitute the largest plantation operation under one management in the South. These plantations have experienced major labor outmigrations plus extensive mechanization since 1939. Their basic operations have changed from cropper cultivation to mechanized cultivation. Their settlement patterns have been greatly affected thereby.

This discussion analyzes (1) reasons for reductions in housesites, (2) existing settlement patterns and their functional attributes, (3) sites selected for houses moved and renovated, and (4) reasons for changes in location of roads. Analysis is performed via maps comparing 1939 and 1954 settlements and settlement features removed or added, and via large-scale maps of repesentative plantation localities.

The following conclusions are reached: (1) Present settlements are crudely agglomerated about tractor stations, the plantations' functional centers. Strongly lineated patterns, adjusted to roads, predominate within each agglomeration. (2) Population has declined more rapidly than have number of houses. Population statistics are not accurate indices of numerical shifts in settlements. (3) Dispersed settlement patterns associated with cropper-operated plantations have not completely disappeared. Deltapine is in transition, settlement-wise, and further changes are anticipated. (4) Present settlement patterns, or even more strongly

lineated ones, cannot serve the needs of mechanized plantation operations with peak effectiveness.

Certain recommendations for inceased efficiency on the Deltapine plantations, through settlement reorganization, are presented in brief form.

HALLOCK F. RAUP—*The United States in Professional Geographic Literature*

Thirty-five years represent roughly the period in which a single generation of American geographers has made its greatest contributions to geographic literature. It is a good time to take inventory of the research accomplishments of members of the geographical profession in this country, insofar as their work has appeared in print. In this paper, maps have been prepared in an effort to determine those geographical problems within the United States that have stimulated members of our profession to undertake research, and what sections of the nation have remained unexploited as topics of investigation.

Four maps present the locations of United States geographic articles appearing in *Geographical Review,* the *Journal of Geography,* and *Annals of the Association of American Geographers* from 1920 through 1954; and *Economic Geography* from 1925 through 1954. A fifth map shows geographic articles on the United States appearing in twenty-eight other publications, both foreign and domestic, 1920 through 1954. The sixth map shows the locations of the topics selected for doctoral dissertations dealing with United States subjects undertaken at twenty-four universities and colleges, 1920 through 1954. The final map is a composite of the preceding six.

From these seven maps certain conclusions have been drawn concerning overstressed areas in American geographic literature, as well as those parts of the country that have been generally neglected by researchers. Certain sections of the United States seem to have appealed widely to geographers; others have been almost wholly ignored. We need to know where the next generation of geographers can place its efforts most effectively; these maps should be of some assistance in that direction. They suggest some of the more fertile areas of geographical investigation in the United States that might well be pursued in the near future.

GEORGE A. RHEUMER—*Precipitation Regions of Western Canada*

In order to arrive at a representative and fairly comprehensive classification of precipitation in British Columbia and Alberta, it is necessary to go beyond a system which is based solely upon empirical values and simple average conditions. With this difference in mind, an attempt has been made to classify the pluvial pattern in terms of dominant precipitation years, and to subdivide the resulting regions in terms of the mode of occurrence of the seasonal precipitation.

Five regions are recognized from this approach. The *north coast* generally has abundant moisture the year around. Occasionally a summer month is deficient. *Southward,* most years are lacking in precipitation during one or more summer months, but at least one winter month has enough to offset this deficiency. In the

greater part of the area, in some years, no month is low. Immediately *east of the coastal mountains* in northern British Columbia, summer totals are low, as they are throughout the southern portion of the province. In some years, however, one winter month may have a minimum, or there is very little difference between totals of the winter and summer months. Throughout most of the *remainder of British Columbia*, this latter condition predominates, but in occasional years, either summer or winter months may be dry. *East of the Rocky Mountains*, most winter months have small amounts but some summers show deficiencies, and in a few years there is insufficient variation between summer and winter monthly totals for either season to be dominant.

WILLERT RHYNSBURGER—*"Drilling Deeper" in Taiwan, 1953–1955*

Taiwan is small, but in some ways it is still surprisingly "unexplored," notwithstanding the characteristic energy with which the Japanese prospected the island and made it yield a profit to the imperial economic system. Recent Sino-American attempts at building industrial capacity and output above prewar levels (following the successful accomplishment of rehabilitation, 1947–1952) disclosed important gaps in resource data which handicapped further progress.

This paper outlines (a) the nature of the deficiency, i.e., an almost complete lack of systematic data on forest, soil, water, fuel, mineral, and fishery resources, and (b) the problems encountered in the selection of techniques for meeting the lack. It notes the role of the geographer and reviews the progress of resource investigations to date.

ALLAN RODGERS—*Industrial Diversification in the United States*

During the past two decades a policy of industrial diversification has been advocated by public and private organizations as a basis for the solution of local economic problems. This paper is concerned with the measurement of the degree of industrial diversification in various industrial areas of the United States and an analysis and explanation of these patterns.

The method used in this study is as follows: The pattern of manufacturing employment for twenty-two industrial groups in ninety-three key industrial areas was compared with the average industrial employment pattern for these areas with the latter considered a reference level. Indices of diversification were computed for 1950 for these industrial areas and correlated with the size of population in these centers. The result is a coefficient of curvilinear correlation of 0.552 and a coefficient of linear correlation of 0.372 with the percentage employed in manufacturing. The various indices were then mapped. The resulting pattern indicates that the greatest centers of diversification lie in large metropolitan centers in coastal locations and on important navigable waterways, or as isolated regional centers in essentially non-industrial areas.

Crude diversification indices, without a fixed reference level, were computed for 1940 and 1950. An analysis of changes during this period indicates that approxi-

mately half of the centers studied diversified significantly, and one-third had significant increases in specialization. The greatest areas of increased specialization were found in Midwestern centers, while the South and to some degree the Middle Atlantic area significantly diversified during this period.

HOWARD G. ROEPKE—*Ore Supply and the Location of the British Iron and Steel Industry*

During the last two centuries five different sources of iron ore have, in turn, been drawn upon by the British iron and steel industry. Each of these sources, during the period of its importance, had a significant effect on the type of location most advantageous to the iron and steel industry and on the pattern of distribution of the industry. These effects are evident in the fairly consistent shifts of the iron and steel industry toward successive sources of iron ore ever since the development of the coke-smelting process.

The major iron ore sources and their impact on the location of the iron and steel industry may be summarized as follows: (1) Small, scattered deposits sufficient for the charcoal-iron industry helped to permit the scattering of the iron industry in search of fuel. (2) After development of the coke-smelting process, most of the ore used came from beds in the coal measures, and from 1710 to 1850 the iron industry was concentrated on those coalfields which also contained iron ore. (3) With the discovery of the first large British iron ore fields distinct from the coalfields, most of the growth of the iron and steel industry took place at the new ore sources. (4) Starting about 1870 and continuing to the present, imported ore became important and helped to attract (or hold) part of the iron and steel industry to coastal areas. (5) Developed at about the same time (1870) and also still important today, the low-grade ore fields of the East Midlands and Lincolnshire became new centers of the iron and steel industry.

DEAN S. RUGG—*The Laxton Open Fields—A Cartographical Review*

The only place in England where the open field system of agriculture still survives is at Laxton in Nottinghamshire. Although the development of Laxton has been studied in some detail, certain aspects of tenure have been neglected. It is felt that a micro-cartographic portrayal of the intermingled holdings of the Laxton Estate may serve to supplement the work of historians and perhaps encourage settlement studies of a similar type.

Certain aspects of the open fields—common meadows and waste grazing—are no longer found at Laxton. However, the three open fields, made up of intermixed and unfenced strips, still remain and are farmed in a rotation of winter wheat, spring crops, and fallow. Control of this relic of a medieval system is still under a Manor Court.

An analysis of the 22 major farms at Laxton shows clearly that the ideal of an open field system—an equal supply of near and good land for each farmer—is not found there today:

1) Overall holdings vary considerably in size, as do the relative proportions of arable and pasture land within holdings.
2) Proportions within the three fields are rarely equal and some tenants do not even have holdings in all of them.
3) Arable strips are small, averaging about three acres (although over three times as large as in medieval times).
4) Distribution of arable strips and pasture shows a dominance of scattered holdings at some distance from the farmstead, although consolidation of pasture near the village is not entirely absent.
5) Paddocks in the village are generally inadequate.

Although Laxton farmers admit that the open field system is uneconomical, they defend it on the basis of its democratic organization. Nearly all of the tenants have worked their way up the "agricultural ladder" with the aid of free sheep grazing on the fallow and a gradual accumulation of small strips and enclosures. Thus in spite of the weaknesses of the system, it is well to emphasize that the economic opportunity and sense of community responsibility preserved at Laxton have been lost in many parts of rural England through the passing of the open field system.

KENNARD W. RUMAGE—*Some Aspects of a Drainage Problem in an Irrigated Area; the Palo Verde Valley, California*

That the success of agriculture in a desert environment is not achieved merely by the liberal application of water to crops is being amply demonstrated in the thirty-three-mile long Colorado River flood plain which comprises the Palo Verde Valley, California. Intensively cultivated, this valley is the largest and most important agricultural development bordering the Colorado River in that state. Alfalfa, cotton, vegetables, and melons are the principal crops, while winter pasturage and feed lot fattening of sheep and cattle furnish supplementary farm income.

The failure of the drainage system to cope with a dangerously high and seasonally fluctuating water table represents the most critical problem affecting land productivity in the valley. It encourages the development of root rot and stimulates the capillary movement of soluble salts in solution to or toward the surface of the soil.

The inadequacy of the existing drainage program is indicative of the imbalance between certain cultural and physical factors in the Palo Verde Valley. This lack of equipoise is the result of the abundance of low-cost irrigation water, irrigation practices, nature of the agriculture, and the rapid expansion of irrigated acreage. The equilibrium is further disrupted by the presence of light-textured pervious soils; river and canal seepage; and finally, the unsatisfactory nature of the valley's main drainage outlet, which was brought about by changing water surface elevations of the Colorado River following downstream completion of the Laguna and Imperial Dams.

KERLIN M. SEITZ—*Are the Part-time Farmers in the Cut-Over of Northern Wisconsin Pioneer Farmers?*

The fringe of part-time farmers that extends along the northern edge of the agricultural areas of Anglo-America has been thought of as pioneer settlement of new agricultural land similar to that which preceded the permanent establishment of farming in United States and Canada. The "Cut-Over" in northern Wisconsin is part of this fringe. Are these part-time farmers of northern Wisconsin pioneer farmers?

Over half of the farmers in northern Wisconsin today report and for the past twenty years have reported off-farm work in the enumerations of the United States agricultural census. These two decades, which include a depression, a war and a post-war boom, complete fifty years of agricultural settlement in the area. Although there has been a decrease in the number of farms and an increase in the size of the farms to that sufficient to support full-time agriculture since 1930, half of the farmers still have other occupations besides farming.

In 700 interviews of rural residents, of which 520 were part-time farmers, four combinations of farming and some other occupation were found. There was also a miscellaneous group. Farming was combined with forestry by about 60 per cent, with urban work by 23 per cent, with recreation activities and mining by about 3 per cent, and with other miscellaneous occupations by the remaining 11 per cent.

The continuation and expansion of most of the non-farm activities in the area appear certain. This available outside work, the historical experience in part-time agriculture plus the expressed lack of interest in full-time farming by most of those interviewed indicate part-time farming as a way of life for about half of the farmers in northern Wisconsin.

ALEXANDER P. DE SEVERSKY—*Air Power and Geopolitics*

No abstract.

RUSSELL STADELMAN—*Our Changing Forests*

The Volunteer State, home of the Great Valley, the Oak Ridge Atomic Center, Shiloh Lookout Mountain and Missionary Ridge, today boasts a green, growing crop—timber—which covers nearly twelve and a half million acres and has an annual sales value of over $270,000,000.

This forest resource is a leading factor in the "New South's" economy. Long established, Memphis still maintains her position as the nation's hardwood center, employing more than 10,000 workers.

The work of pioneer settlers in clearing land, in building barns, forts, and crude but sturdy homes was the forerunner of what is today Tennessee's vitally important forest industry, an industry in which salaries and wages alone total $110,000,000 annually.

Tennessee, primarily a hardwood state, in 1954 was the location of the South's

third newsprint mill with a $63,000,000 plant, pulping 130,000 tons of newsprint annually from Southern pines.

Southern forests are being managed increasingly by sound forestry practices. Growing markets are resulting in thousands of "forgotten acres" being returned to trees. The South now leads in reforestation.

Management of existing forests is more important than reforestation and here industry is cooperating with governmental agencies to provide aid to the small woodlot owner. The Nickey "Tree Farm Family" of cooperating woodlot owners is an example of this cooperation.

Today, from the small farm woodlot or forest plantation, where the raw material is grown, to the manufacturing plants, where trees are turned into hundreds of different products, forestry is playing a leading role in Tennessee's agricultural and industrial life.

RAYFRED L. STEVENS—*Mexico and Humboldt, One Hundred Fifty Years Later*

The sesquicentennial of Alexander von Humboldt's travels in New Spain (1803–1804) having just passed, it is timely and worthwhile to re-evaluate that substantial part of his work. As a basis for such a study, and to collect material for a comparative study of the Mexican landscape then and now, I repeated Humboldt's journeys. In order to perceive analogous seasonal impressions, I kept as closely as possible to the exact 150th anniversary of his itineraries.

Study of the relatively permanent features of the landscape—geology, climate, etc.—has confirmed indisputably the astounding accuracy of Humboldt's observations. The changing features of the landscape—demography, economic and political patterns, etc.—demonstrate an equally astounding accuracy in his interpretations and prognostications.

Voluminous materials of geographic interest had already been gathered in Mexico by predecessors and contemporaries of Humboldt. Mexico did much for him by placing this material at his disposal; he did much for Mexico by synthesizing it and organizing it coherently with his own. But of more importance to geographers is what Humboldt's Mexican work did for geography.

In Mexico, Humboldt further confirmed and crystallized the ideas of physical geography formulated in his previous travels. In the *Essai Politique sur le Royaume de la Nouvelle Espagne* he undertook complete, regional analysis. The inspiration that geographers have obtained from that work establishes him as the Founder of Modern Regional Geography.

CHARLES MILLER STRACK—*Agricultural Change in the TVA Area, 1930–1950*

The effectiveness of regional planning programs such as the Tenessee Valley Authority and their extension into other areas in the United States is a matter of controversy. Because available reports on the TVA have several shortcomings, further study seemed warranted. In doing so, the study was limited to changes in the agricultural landscape from 1930 to 1950.

The Ozark Highland area was selected for comparison with the TVA area. In both, the type-of-farming regions, based on sources of farm income, were mapped, and a sample county was selected from each region. Data for the over-all and internal agricultural developments in these counties were computed and compared for crop specialty, production-for-use, and general farming regions. This process isolated changes which were greater in the TVA counties. Correlations to surface and soils distributions were introduced in order to compare apparent degrees of adjustment inside and outside the TVA area. The differential changes not explained in terms of local physical or cultural influences were then considered in the light of TVA objectives and operations concerning farm management, reservoir construction, and urban developments. The resultant evidence indicates that there has been a measurably greater change in the TVA area: a more "rational" adjustment to local surface and soils factors, increased rural levels of living, and population readjustments, but that these differences are only slightly more prevalent inside than outside the TVA area.

EDWARD J. TAAFFE—*U. S. Air Passengers, A Map Analysis*

Analysis of selected maps indicates that four significant factors have been involved in the development of U. S. air passenger traffic. The two primary factors are population and urban grouping; the two secondary factors are city function and overnight rail service.

Population dominance is expressed by the inordinate concentration of air passenger traffic in a relatively few large centers—particularly those with a metropolitan area population greater than 500,000. Traffic shadow is evident in the low per-capita passenger indexes at most cities located within 120 highway miles of a larger city. The factor of city function is evident not only in the high per-capita traffic generation of the resort cities but also in the relatively high indexes at wholesale and retail cities. The absence of overnight rail service is still another factor increasing the air passenger traffic of such long-haul cities as those in Texas and Florida.

Map analysis techniques employed in the paper consist of:

1. Comparison of air passenger and urban population maps so as to establish preliminary generalizations.
2. More precise analysis of a map of per-capita air passenger indexes.
3. Separation of traffic shadow cities from the passenger index map so as to provide a base map for consideration of the effects of city function and overnight rail service.

RICHARD S. THOMAN—*The Free Port: An Outmoded Trade and Transport Device in Northern Europe?*

Among devices created to facilitate movement of goods and associated shipping around or over tariff barriers, the free port has proven one of the most enduring.

However, in Germany, Denmark, and Sweden, where free ports have been in existence fom 30 to over 75 years, questions are being raised as to whether the device is now antiquated.

A free port is an isolated, fenced, and patrolled district which, with respect only to customs laws of the host country, is foreign territory. It is found usually in a seaport, where it constitutes a part of the port facilities. Incoming foreign goods, whether or not subject to duty, may enter it duty free for purposes of transshipment (direct or indirect), warehousing, sorting, and similar operations including, in some cases, manufacturing. Retail stores and private dwellings are generally not allowed. Should the goods eventually move into the host country, the usual customs formalities are executed at the free port fence. If they move to a foreign country, they are not subject to such formalities. The free port is thus particularly useful in aiding transshipment of merchandise not intended for the host country. It is also useful in providing (1) duty-free ships' stores, and (2) a delayed liquidation of dutiable goods destined for import into the host country.

The present difficulties of the Northern European free ports are occasioned by the fact that the volume of transshipment traffic—the function for which the device of the free port was created—has been sharply reduced within the past quarter century. This reduction has been due particularly to the isolating effect of the Iron Curtain, and to the growth of direct shipping services among many of the world's secondary ports that formerly depended upon transshipment services.

However, there is strong disagreement concerning specific action to be taken. In the German free ports of Hamburg and Bremen, which developed from pre-Bismarck free cities, there exists strong local sentiment for continuation—and even expansion—of free port functions; in particular, emphasis is placed upon more manufacturing inside free port boundaries. In contrast, the view of the national government in Bonn is that free port activities should be limited to warehousing, direct transshipment, and ship chandlering; since, with decline of transshipments, existing manufacturing in free ports is increasing competition with that of Germany proper, free port manufacturing should be abolished. In the Scandanavian free ports of Copenhagen, Göteborg, Stockholm, and Malmö, where the free ports mechanism was borrowed from Germany for stimulating transshipments, and is now viewed less emotionally than in Germany, the majority of free port managers are skeptical concerning the future of the mechanism. Free port manufacturing is looked upon by them as of dubious feasibility, chiefly because of resistance from inland manufacturers. All major free ports of northern Europe are being used increasingly for export and import movement—not because they are free ports, but because they occupy well-maintained deep water facilities.

Since they function primarily to facilitate transshipment, and since the long-term trend of transshipment is downward, the free ports of northern Europe may have passed their peak period of usefulness. Their future depends critically upon relationships between the Communist and non-Communist blocs of nations in the world. If the Iron Curtain remains firm, it appears probable that many smaller

free ports will be abolished, and the larger free ports of Hamburg, Bremen, and Copenhagen will be of increasingly limited value. Inasmuch as free ports occupy the major deep water facilities in each of these large ports, the decreasing significance of the free ports will not necessarily be reflected in port traffic. On the other hand, if the Iron Curtain is softened, the north European free ports could benefit as liaison portals.

BENJAMIN E. THOMAS—*The Trade Center of Timbuctoo*

Timbuctoo was once a great emporium as well as a center of Moslem faith and learning. It was known as the port of the Sudan in the Sahara where the northward bend of the Niger River made possible a meeting of the camel and the canoe. It was the exchange place for slaves and gold from the Sudan against imports from Morocco by means of camel caravans. African rulers, religious leaders, scholars, merchants and artisans, and European explorers were attracted to the city.

Wars and political instability probably started the decline of Timbuctoo. Also, the Sudanese gold mines became exhausted and the slave trade was suppressed. The opening of inland routes from the coasts of west Africa, the abandonment of trans-Saharan camel caravans, and the development of Saharan motor routes from Algeria favored other towns. Timbuctoo was left as a village almost inaccessible to motor transport, served only by seasonal service on the Niger and by trails. It is still a market for Saharan salt and local produce, but it is not a center for any kind of trans-Saharan trade.

The past reputation of Timbuctoo is so strong that modern reference books erroneously describe it as a center of trans-Saharan roads, and small-scale maps often show the village in big letters while omitting larger places like Bamako, a modern center of rail, motor, river, and air traffic, with ten times the population of Timbuctoo.

JOHN H. THOMPSON—*Manufacturing in the Hanshin District, Japan*

The second largest concentration of manufacturing in Japan, and in all Asia as well, is located in the metropolitan agglomeration called the Hanshin District. Although centering on the cities of Osaka and Kobe, the Hanshin District also includes twenty satellite cities (Shi) and certain rural areas (Gun).

The purpose of this paper is to describe and interpret the spatial arrangement of manufacturing within this great industrial area.

Factories with more than ten employees, some 10,000 in all, were mapped by type and size. They occur in large numbers almost all over the built-up sections of Osaka, but in Kobe and in some of the other cities, sizeable areas are completely free from manufacturing.

Level land, space for factory sites, existing vacant floor space, access to the sea or other modes of transportation, available industrial water, and spatial affinity of certain factories for others are all major site conditions affecting the detailed

manufacturing geography. Large-scale, heavy industry concentrates on coastal sites served by tide water—frequently on filled land. Small metal and machinery plants are scattered widely in the densely built-up sections outside the commercial core of the cities and marginal to heavy industry areas. Textile, and other large-scale, light industries which require large parcels of land are commonly found on sites outside the built-up areas of cities, the factories often being completely surrounded by farms. Lumber and wood-working plants, heavily dependent on imported logs and on pond storage, occur largely along canals near the sea. The commercial cores of the cities have relatively few factories, with printing, food, and clothing establishments predominating.

VINCENT M. THROOP—*The County Division, a New Statistical Area*

Recent research for suitable census areas resulted in the development of the county division as a new type of reporting unit.

The county division, unlike the usual minor civil division, has visible boundaries that enumerators can find. County divisions also contain enough inhabitants or farms to constitute a statistically significant grouping and to permit economical tabulation. To attain comparability over several decades, these divisions are to remain essentially unchanged. Divisions within a state are organized according to uniform rules.

The functional organization of rural counties suggests that trading activities offer a durable basis for county division. Centers offering at least a basic selection of such style goods as clothing show evidence of continuing strength. Usually the minimum population of such centers is 500. Where the farm to town ratio of population is at least one to one, a county division thus would contain 1,000 persons. The optimum population of a county division is 3,500 and the maximum level is 7,000 persons. Portions of counties unaccounted for on this basis are divided according to land use.

The actual process of county division consists of locating all centers of 500 or more persons, drawing a circle with a radius equal to the average distance travelled by farmers to the nearest shopping center and choosing nearest visible features such as roads, railroads, streams, and irrigation canals as boundaries. Consideration also is given to the major land uses.

County and state leaders review the divisions and critical boundary features are field inspected.

J. ALLEN TOWER—*The Negro Exodus from the South*

The recent Supreme Court decision and current action to end racial segregation in schools has led to near mob action in some locations and to action in at least three Southern states preparatory to possible termination of the public school system. This situation interests us vitally as citizens. As geographers, we are particularly interested in the location of the Negro, and the trends in change in that

location. These phases need to be examined also in the light of current shifts in the white population.

Our people are migratory. In the United States 6.2 per cent of the population in 1950 resided in a county different from that in the previous year; the South and the West exceeded the national average. The available evidence indicates greater migratoriness for the Negro than for the white, at least in the South. Traditionally the Negro has been considered a Southern problem. The South, with 21.9 per cent of its population non-white in 1950, contains two-thirds of all Negroes. However, more Southern counties showed decreases in non-white than in white population from 1940 to 1950. The increased dispersion of the Negro to other parts of the country is making him increasingly a national problem.

This study analyzes the 1950 location of Negroes by states and by Southern counties. For the South it compares by counties the non-white areas with the white areas of increase and decrease from 1940 to 1950. A detailed study of Alabama is made, with corrections of the census data to allow for births and deaths in the inter-census years. An analysis is also made of the areas to which the Negro has moved from the South.

JOHN H. VANN—*Recent Changes in the Delta of the Rio Atrato*

The delta of the Rio Atrato in the Gulf of Uraba, northwestern Colombia, shows physical features which permit recognition of recent changes in its landforms, hydrography, and vegetation. Vegetation in the delta region is zoned according to drainage, salinity of water, and soil type. A regular vegetation succession develops on new land that is quite distinctive from the older vegetation associations of the mangrove swamp, natural levees, and freshwater backswamps. The eroded condition of the new land association and the mangrove swamp permit the division of the deltaic coast into areas of active accretion and active erosion. Recent changes are rendered intelligible on the basis of the condition of the vegetation.

A vegetational approach to the study of deltaic development has been too little utilized by geomorphologists. It is hoped that this paper will help focus attention on its value as a tool in field studies.

The Atrato Delta has been mapped several times since 1832 and each map records changes in the delta which are related to the natural delta-shaping processes. The record of changes in the delta has been carried down to the present through field work in the summer of 1954 aided by aerial photographs made by the U.S.A.F. in 1943. Bore hole evidence reveals that subsidence in addition to wave erosion and river accretion have been the predominant delta-shaping agencies.

STEPHEN S. VISHER—*Some Climatic Handicaps of the South*

The many maps of *Climatic Atlas of the United States,* published in November by Harvard University Press, facilitate comparisons of the South with other parts of the United States. This paper consists chiefly of pointing out on a score of maps respects in which the southern half of the eastern United States differs significantly

from the northern half as to climatic criteria of obvious great significance. Included are duration of high temperatures of various sorts, intensity of rainfall, excessive rainfalls, especially during the cooler months, drouths, storms, and drastic departures from average temperatures and precipitation. Some local consequences of these climatic conditions are mentioned.

KEMPTON E. WEBB—*The Climates of Northeast Brazil According to the Thornthwaite Climatic Classification*

Northeast Brazil is, with some exceptions, an extremely dry area. According to Thornthwaite's classification, 55 per cent of the 140 stations of the 41st West Meridian are semi-arid ("D" or "E"), 40% are sub-humid ("C"), and only 5% are humid ("B"). Low altitude and low elevations yield high potential evapotranspiration, which appreciably increases the difference between rainfall and effective moisture. Areal differences in moisture regions are due to elevation, surface configuration, and location with reference to the zone of dependable summer rains in central Brazil and the zone of dependable winter rains on the east coast of Brazil.

The moist areas are restricted to a zone less than 160 kilometers wide along the east coast, and to four small inland areas of higher elevation. The remaining area is dry, with notably low values of moisture index in northern Bahia and central Paraíba.

Low values of summer concentration of thermal efficiency, ranging between 25.2 and 31.1 per cent, reflect low latitude. Seasonal variation of effective moisture shows that most of the interior of the Northeast has little or no surplus of effective moisture. The entire coast has a moderate winter surplus (or moderate summer deficit) of effective moisture, with small areas of little or no deficit along the east coast and at higher elevations farther inland.

The Thornthwaite and Köppen climates are similar in their designation of coastal winter rains, and in the correspondence of Köppen's "B" climates and Thornthwaite's "E" and "D" climates. Differences occur in the more humid areas, since Thornthwaite focuses attention on effective moisture, and Köppen's classification includes such broad temperature and rainfall categories. Neither system indicates the distinctive high rainfall variabilty in the Northeast, yet both systems, and more especially Thornthwaite's, point to the average conditions of extreme dryness over most of that area.

GUIDO G. WEIGEND—*The Concepts of Hinterland and Foreland in Port Geography*

The German word "Hinterland" has been adopted into several languages, but its meaning has been debated and disputed. The concept of "foreland" is proposed here in connection with studies in port geography. It denotes not maritime space extending from the port but the seaward trading areas which are connected with the port through maritime organization.

The significance of the hinterland and foreland concepts, as well as that of

maritime organization, can be well illustrated by an analysis of the port of Hamburg. After World War II, its port traffic recovered much more slowly than that of other North Sea ports, but the contention of port authorities that this was the result of the loss of nearly one-half of the port hinterland is only partly correct and ignores many other factors which come into play. Hinterland traffic decreased to and from areas behind the Iron Curtain because of Soviet and East German policy; it also decreased toward West Germany as a result of Allied policy and the port's location in the northeastern corner of the new Germany.

The maritime connections of Hamburg in 1953 show significant changes as compared to those of 1938. The number of departures to European destinations, and especially to West and East German ports, was considerably less but overseas ties of the port were generally strengthened. Such shifts were caused by changes in international patterns of production and trade, as well as by increased competition with foreign shipping.

The implications of the dependence of shipping and port development on the respective forelands is clear. The foreland is as integral a part of the shipping pattern as are the hinterland, the shipping lines, and the port itself. The entire complex must be analyzed and evaluated for each individual port, because the relationships of each to the complex are different from those of the others.

THOMAS R. WEIR—*Relation of Daytime Population to the Functional Areas of Metropolitan Winnipeg*

The purpose of this paper is to show (1) the distribution and density of the daytime population of Metropolitan Winnipeg in relation to the functional areas and (2) the rate of change between nightime and daytime population within the functional areas. First the city was mapped according to its functional zones: central business district, outlying commercial, industrial, residential (in five classes), and institutional. Statistics showing daytime population for all areas were gathered and mapped and correlations were obtained.

The daytime population of Metropolitan Winnipeg, based on statistics gathered in the field, was found to be 378,045—varying from the census count by 2.7 per cent. This daytime population was found to be distributed in relation to functional areas as follows: Central business district, 25 per cent; industrial (light and heavy), 10 per cent; outlying commercial, 4 per cent; schools, hospitals, and cultural institutions, 17 per cent; residential areas, 56 per cent.

Percentage change in daytime-nightime population *within* residential areas varied as follows: Blighted rooming-house districts, 60 to 66 per cent; better-class rooming house and apartment districts, 56 to 59 per cent; modest homes of working classes, 50 to 55 per cent; newly built-up areas, 35 to 45 per cent; superior residential districts, 48 to 54 per cent. In general, where children were few as in the poorer rooming house and multiple dwelling areas, a large percentage went daily to work. In more desirable multiple dwelling areas, a larger proportion of families resulted in a smaller percentage leaving for work or school. In middle class homes,

where families were the rule, the proportion of children in school and adults at work was about equal to the numbers remaining in the home. In the more newly built-up districts, the large proportion of young families with pre-school age children produced a marked lowering in the percentage away from home in the daytime. In superior residential districts, where families were small, the percentage away from home was approximately equal to those remaining at home during the day.

JOSEPH E. WILLIAMS—*Drawing Maps for Merged-Color-Shaded Relief*

The merged-color-shaded relief map seems to serve the needs of geographers and cartographers who wish to study landforms accurately. The layer color representation of relief seems outdated in terms of the new cartographic techniques. In order to prepare a manuscript map of color with shaded relief it is necessary to use many techniques involving the use of transparent colors and adequate methods of applying the shading.

A good grade of drawing paper pasted on a material which will not change with temperature is the best base. The contours and hydrography are then drawn on this paper and form the base for all other operations. If the contours are to remain in the background of the finished map, they can be done in brown. If it is desirable not to have the contours in the final map, they would be drawn in a very light blue and filtered out in the photographic process. After this base has been prepared a choice of colors should be made which would give the greatest stereoscopic effect to the relief. The best results seem to be achieved with dark receding colors for the water and lower areas and bright colors for the higher areas. The bright colors for the higher areas make it possible to shade the ridges of the higher mountains and peaks more intensively in order to dramatize the relief. Colors are now available in printers inks which are suspended in an acetate base. These are applied with a brush and the excess is wiped off with cotton attached to a stick. After the colors chosen have been applied to the various contour levels the same as the layer color system, shading is applied by hand with the colored pencils and stomps are moistened with a solvent. This provides for better control and more rapid application of shading. It is much faster than air brush methods. Also, it is possible to remove and add shading where desired.

Now that the layer colors and the shading have been applied it is necessary to trace over the hydrography with opaque blue colors to cover up the transparent colors which may have obscured portions of water features. Regular poster color is quite satisfactory for this operation and can be applied with an ordinary pen. This completes the color manuscript for the map. The map may be photographed and four color plates made for printing.

The next step is to prepare acetate overlays for cultural features, such as roads, railroads, cities, and any other data needed. These overlays may be prepared over the original or the combined printing of the color plates. In case the original has been properly pasted to a base, it will not change dimensions with temperature.

It can be used but it may be better to print the color first and use it as a base for the culture features on acetate. Printing plates are made from the acetate and the final map is the result of overprinting this on the combined color plate.

ANDREW W. WILSON—*The Supporting-Dependent Analysis of Income Payments to Individuals*

One of the most helpful tools yet developed for the study of the economic bases of cities and counties is the supporting-dependent ratio analysis of employment by industry groups. Hoyt, Alexander, Ullman and others have written about and used this methodology, although labeling the ratio basic-nonbasic, basic-service, or some other dichotomy rather than supporting-dependent. It is proposed in this paper to carry this type of analysis to a new set of data, income payments to individuals.

County estimates of income payments to individuals are available now in several areas of the United States and techniques for making them have been published. Supporting-dependent ratios for estimated payments of earned income to individuals may be found by applying the supporting-dependent employment ratios previously determined for the comparable industry groups. For unearned income, not taken into account in employment ratios, sampling of the general population may provide the basis for constructing ratios.

By bringing income payments into the analysis, the researcher is enabled to move a bit closer to the actual relative importance of sources of supporting income in his community, including unearned income which is not touched by the analysis of employment data alone. He also takes into account some of the differences in wage rates. He is enabled to pin-point more closely the make-up of the county's real economic base.

Material from a study of the Tucson Standard Metropolitan Area, Arizona, is used to illustrate the points raised.

WALTER F. WOOD—*The Relationships of Relief*

This is an exploratory investigation undertaken to determine whether there is a statistically expressible relationship among the elements of physical geography. The specific problem is to find predictors of relief among the other ingredients of the environment. Relief was measured on 202 individual square miles mapped on an equal number of U.S.G.S. topographic sheets chosen at random from the entire United States. The relief was correlated with elevation, base level, bedrock, vegetation, and climate. The introduction of each successive variable allowed the construction of more precise prediction formulas and the placing of more reliable confidence limits. Predictions of relief on forest land less than 5,000 feet above sea level and lying on sedimentary rock can be made with an accuracy of 90 feet in two out of three cases. By contrast, predictions made using only elevation above sea level as the sole predictor of relief have a comparable error of 415 feet.

A sample of considerably larger size would be needed before proper weight

could be given to each of the significant variations in the physical environment, but it appears that such an investigation would be fruitful. The gaining of more knowledge should permit the accurate prediction of slope and relief in all areas of the country not yet mapped at topographic scale. The gaining of considerably more knowledge may eventually permit the development of a physical geography which simultaneously concerns itself with all of the elements of the natural environment.

BOGDAN ZABORSKI—*Geographical Aspects of Urban Settlements in Canada*

This paper is based on the results of the work performed in the summer of 1954 by the author with the assistance of Messrs. L. McNeil, J. Reid, and L. Swatridge within the "Atlas of Canada" project in the Geographical Branch of the Department of Mines and T.S., Ottawa.

Only in Newfoundland are irregular plans of towns frequent. In most other areas rectangular grid dominates. Urban concentration of houses in the vicinity of a bridge often produces a fan of radial streets. Small urbanized settlements often crystallize at crossroads. If additional streets are built, an urban nucleus originates. Curved lines of streets are met in recent districts of garden-cities.

The function of the city, such as mining, industrial settlement, railway junction or port, is reflected in its plan. Fortifications or protective walls are visible in the plan of a few cities.

Most urban settlements in Canada are well adapted to the relief and hydrography. Built-up area often fills the whole space between the slope and the river. Some of the cities, however, climb up the slopes or even are located on several levels. In a few cases towns are situated on the deltas of streams.

The growth of urban settlements is illustrated by graphs based on census figures (1921–1951) and on a map. The economic character of cities is shown on maps based on 1951 census data. Predominant occupations are shown to illustrate real functions of the city. Urban economic regions are distinguishable.

LEONARD ZOBLER—*The Use of Cultural Data to Statistically Validate Physical Regions*

When the surface of the earth is organized into regions according to physical properties it is questionable whether cultural traits have been distributed according to the same areal patterns. The hypothesis of an areal association between physical and cultural phenomena may be tested for statistical significance without introducing the idea of causality. Statistical significance is here interpreted to mean that differences in the spatial distributions of selected cultural traits among physical regions are too great to be attributed to chance. However, if the differences are small the observations may have been due to chance.

The chi square test was used to ascertain whether a statistically significant association exists between the physical regions of Salem County, N. J., and the regional patterns of cultural response. Based on geomorphic-geologic features eight

physical regions were organized. From each of these regions data were collected on land use, type of farm, and population groups.

Tests of significance on each of these cultural traits were made for the overall regional pattern. The results were significant. Each region was then tested separately against every other region. Several pairs did not exhibit significant differences. This may be interpreted to mean that such regions should not have been separated.

The patterns of cultural response are thus more complex than the simple physical regionalization indicates because they vary internally. Statistical analysis provides a tool for revealing the nature of this internal variation.